STAFF REPORT

Report To: Board of Supervisors **Meeting Date:** June 15, 2017

Staff Contact: Susan Pansky, Special Projects Planner

Agenda Title: For Possible Action: To approve a Tentative Planned Unit Development request from Liberty Homes, LLC (property owner: Vernon C. Lee Family Trust) to amend the existing Riverview Terrace Planned Unit Development to divide two parcels into five, on property zoned Single Family 21,000 - Planned Unit Development (SF21-P), located at 4404 and 4080 Hells Bells Road, APNs 010-361-05 and -06. (TPUD-17-053) (Susan Pansky, spansky@carson.org)

Staff Summary: The applicant proposes to amend the existing Riverview Terrace Planned Unit Development that was originally approved on October 5, 1978. The amendment will add three single-family residential lots to the total unit count of Riverview Terrace by merging and resubdividing two existing lots on the west side of Hells Bells Road, west of the intersection with Parkhill Drive. The overall boundary of the Riverview Terrace Planned Unit Development is not proposed to change, nor will the ratio of developed property to open space. The lot sizes for the five new proposed lots will be consistent with the underlying zoning of Single-Family 21,000 (SF21).

Agenda Action: Formal Action/Motion **Time Requested:** 30 minutes

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Proposed Motion

I move to approve TPUD-17-053, a Tentative Planned Unit Development request from Liberty Homes, LLC (property owner: Vernon C. Lee Family Trust) to amend the existing Riverview Terrace Planned Unit Development to divide two parcels into five, on property zoned Single Family 21,000 - Planned Unit Development, located at 4404 and 4080 Hells Bells Road, APNs 010-361-05 and -06 based on the findings and subject to the conditions of approval in the staff report.

Board's Strategic Goal

Economic Development

Previous Action

The Planning Commission recommended approval of the proposed Tentative Planned Unit Development at their meeting on May 31, 2017 by a vote of 5 ayes and 0 nays with 1 absent.

Background/Issues & Analysis

The Planning Commission found that the proposed Tentative Planned Unit Development meets the required findings pursuant to the Carson City Municipal Code. Please see the attached staff report to the Planning Commission for further explanation.

Attachments:

1) Planning Commission Staff Report
2) Tentative Planned Unit Development Application (TPUD-17-053)

Applicable Statute, Code, Policy, Rule or Regulation

NRS Chapter 278A (Planned Development), CCMC Section 17.07 (Findings), CCMC Section 17.09 (Planned Unit Development)

Financial Information

Is there a fiscal impact? ☐ Yes ☒ No

If yes, account name/number:

Is it currently budgeted? ☐ Yes ☐ No

Explanation of Fiscal Impact:

Alternatives

1) Modify the recommended conditions of approval for the request.
2) Refer the request back to the Planning Commission for further review.
3) Deny the request.

Board Action Taken:

Motion: _____ 1) _____ Aye/Nay

2) _____ _____

_____

_____

_____

_____

_____

(Vote Recorded By)

STAFF REPORT FOR THE PLANNING COMMISSION MEETING OF MAY 31, 2017

FILE NO: TPUD-17-053 **AGENDA ITEM: H-2**

STAFF AUTHOR: Susan Pansky, AICP
Special Projects Planner

REQUEST: To make a recommendation to the Board of Supervisors regarding a Tentative Planned Unit Development request from Liberty Homes LLC (property owner: Vernon C. Lee Family Trust) to approve an amendment to the existing Riverview Terrace Planned Unit Development to divide two parcels into five, on property zoned Single Family 21,000 – Planned Unit Development (SF21-P), located at 4044 & 4080 Hells Bells Road, APNs 010-361-05 & 010-361-06.

APPLICANT: Liberty Homes LLC

OWNER: Vernon C. Lee Family Trust

LOCATION: 4044 and 4080 Hells Bells Road

APN(s): 010-361-05 and -06

RECOMMENDED MOTION: "I move to recommend approval of TPUD-17-053, an amendment to the Riverview Terrace Planned Unit Development, to divide two parcels into five, on property zoned Single Family 21,000 – Planned Unit Development, on property located at 4044 and 4080 Hells Bells Road, APNs 010-361-05 and -06, based on the findings and subject to the recommended conditions of approval in the staff report.

RECOMMENDED CONDITIONS OF APPROVAL:

1. The applicant shall sign and return the Notice of Decision including conditions of approval within 10 days of receipt of notification. If the Notice of Decision is not signed and returned within 10 days, the item may be rescheduled for the next Planning Commission meeting for further consideration.

2. All lot areas and lot widths shall meet the zoning requirements approved as part of this Planned Unit Development with the submittal of any parcel map or final map.

3. The applicant shall construct all retaining walls of earth tone materials approved by the Planning Division. The retaining wall on Lot 5 shall be subject to approval by the Parks Department and Planning Division to mitigate visual impacts from the Moffat Open Space property and to blend with the surrounding natural environment.

4. The applicant and or future homeowner(s) of Lot 5, will be responsible for the removal of any graffiti on the seven foot high retaining wall. It is recommended that the applicant's contractor apply an anti-graffiti coating to the wall to facilitate future removal of any tagging.

5. The applicant shall record a deed restriction on Lot 5 indicating the property owner's responsibility to maintain the retaining wall on both the private property and the Carson City open space side. This maintenance responsibility includes removal of graffiti from the Carson City open space side of the wall.

6. It will be the applicant's and/or future homeowner(s) responsibility to maintain all open space/natural areas and provide defensible space associated with each parcel in the development.

7. The Unified Pathway Master Plan identifies the concrete path along Hells Bells Road as part of the City's path system connecting the Moffat Open Space Property to the north end of the Prison Hill Recreation Area. This facility needs to remain open and in place during any construction on the parcels. Any damage due to construction related activities must be repaired to the City's satisfaction.

8. The parcels abut Carson City Open Space property. All construction activities shall remain on the subject parcels and must not impact and/or damage any area or natural vegetation on the Open Space property.

9. The applicant will be required to provide a staging plan that reflects all construction related parking. All vehicles shall remain on the subject parcels or along Hells Bells Road. Vehicles will not be allowed to utilize the Moffat Open Space property's gravel parking lot or the adjacent open space areas.

10. The applicant will be required to incorporate "best management practices" into their construction documents and specifications to reduce the spread of noxious weeds. The Parks Department is willing to assist the applicant with this aspect of their project.

11. Hours of construction will be limited to 7:00 a.m. to 7:00 p.m., Monday through Friday, and 7:00 a.m. to 5:00 p.m. on Saturday and Sunday. If the hours of construction are not adhered to, the Carson City Building Division will issue a warning for the first violation, and upon a second violation, will have the ability to cause work at the site to cease immediately.

12. Lots not planned for immediate development shall be left undisturbed and mass grading and clearing of natural vegetation shall not be allowed. Any and all grading shall comply with City standards. A grading permit from the Nevada Division of Environmental Protection shall be obtained prior to any grading. Noncompliance with this provision shall cause a cease and desist order to halt all grading work.

13. A drainage easement must be provided along the slope cut-off ditch west of the building pads.

14. The slope cut-off ditch west of the building pads must drain to the Hells Bells Road right-of-way drainage system. Any portion of this ditch that cannot drain to this right-of-way must be properly designed to promote sheet flow at the outfall and prevent erosion. Drainage onto adjacent property may not exceed pre-development runoff quantities. Any outfalls must be riprapped or otherwise protected from erosion.

15. The east property line, along Hells Bells Road, must be adjusted to follow the logical right-of-way alignment.

16. Per the Preliminary Geotechnical Report, a final geotechnical report must be prepared that addresses the proposed structures and related site development. The report must include allowable bearing capacity, estimated settlement under design loads, foundation grading criteria, slope design, erosion control criteria, and other site specific or specialized geotechnical information as needed.

17. All construction and improvements must meet the requirements of Carson City Standard Details, including CCDS Division 7, Hillside Development.

18. The applicant shall provide construction plans to the Engineering Division for approval of all required on-site and off-site improvements, prior to any submittals for approval of a final map. The plan must adhere to the recommendations contained in the project soils and geotechnical report.

19. The applicant shall obtain a dust control and stormwater pollution prevention permit from the Nevada Division of Environmental Protection (NDEP). The site grading must incorporate proper dust control and erosion control measures.

20. The project must comply with the 2012 IFC and northern Nevada fire code amendments.

21. The project must comply with the 2012 IWUIC and northern Nevada fire code amendments due to being under the hillside development ordinance.

22. A "will serve" letter from the water and wastewater utilities shall be provided to the Nevada Health Division prior to approval of a final map.

23. A Final Map, prepared in substantial conformance with the Tentative Map, must be approved and recorded within four years after the approval of a Tentative Map unless a longer time is provided for in an approved development agreement with the City.

24. The following notes shall be added to the Final Map:

    A. These parcels are subject to Carson City's Growth Management Ordinance and all property owners shall comply with provisions of said ordinance.

    B. All development shall be in accordance with the Riverview Terrace Planned Unit Development Amendment (TPUD-17-053).

    C. The parcels created with this Final Map are subject to the Residential Construction Tax payable at the issuance of Building Permits for residential units.

25. A copy of the signed Notice of Decision shall be provided with the submission of any Final Map.

26. The applicant shall provide evidence to the Planning Division indicating the all agencies' concerns or requirements have been satisfied and that all conditions of approval have been met.

27. Prior to the recordation of the Final Map for any phase of the project, the improvements associated with said phase must either be constructed and approved by the City, or the specific performance of said work secured by providing the City with a proper surety in the amount of 150% of the engineer's estimate. In either case, upon acceptance of the improvements by the City, the developer shall provide the City with a proper surety in the amount of 10% of the engineer's estimate to secure the Developer's obligation to repair defects in workmanship and materials which may appear in the work within one year of acceptance by the City.

LEGAL REQUIREMENTS: NRS Chapter 278A (Planned Development), CCMC Section 17.07 (Findings), CCMC Section 17.09 (Planned Unit Development), CCMC Section 18.02.085 (Variances), CCMC Section 18.04.060 (Single Family 21,000)

MASTER PLAN DESIGNATION: Low Density Residential (LDR)

ZONING DISTRICT: Single Family-21,000 – Planned Unit Development (SF21-P)

KEY ISSUES: Does the proposed amendment meet the Planned Unit Development requirements and other applicable requirements? Are the proposed lot sizes appropriate for the zoning district and existing Riverview Terrace Planned Unit Development? Does the addition of three lots to the overall lot count have a negative impact on the surrounding area and/or the existing Riverview Terrace Planned Unit Development?

SURROUNDING ZONING AND LAND USE INFORMATION:

NORTH: Public Community (PC)/Open Space – Carson City
SOUTH: Single Family 21,000 – Planned Unit Development (SF21-P)/Single Family Detached Residential Uses
WEST: Public (P)/Vacant Land – State of Nevada
EAST: Single Family 21,000 – Planned Unit Development (SF21-P)/Single Family Detached Residential Uses

ENVIRONMENTAL INFORMATION:

FLOOD ZONE: Zone X Unshaded (areas of minimal flooding)
SLOPE/DRAINAGE: Moderate to steep, sloping to the southeast and northwest
SOILS: 21 – Greenbrae Gravelly Sandy Loam, 35 – Indiano Gravelly Fine Sandy Loam, 77 – Voltaire Silty Clay Loam
SEISMIC ZONE: Zone II (Moderate) – Earthquake fault on site

SITE DEVELOPMENT INFORMATION:

SUBJECT SITE AREA:	3.07 acres
EXISTING LAND USE:	Vacant land
TOTAL RESIDENTIAL LOTS:	Two existing, five proposed
PROPOSED LOT SIZES:	21,278 to 32,919 square feet (average 26,781 square feet)
REQUIRED SETBACKS:	Periphery setback – 20 feet
	Front – 20 feet
	Side – 10 feet
	Rear – 20 feet
PARKING REQUIRED:	Two spaces per dwelling unit

SITE HISTORY:

- CPUD-17-036 – Conceptual Planned Unit Development review for five single family residential units

BACKGROUND:

On April 18, 2017, the applicant participated with City staff in a Conceptual Planned Unit Development review (CPUD-17-036) for the proposed development per the subdivision process requirements of the Carson City Municipal Code (CCMC). The purpose of the Conceptual Planned Unit Development review is for City staff to provide comments to the applicant regarding City requirements for the proposed subdivision.

The Riverview Terrace Conceptual Map proposal consisted of two existing single family residential lots on 3.07 acres within the Riverview Terrace Planned Unit Development (PUD), which the applicant proposed to subdivide further into a total of five single family residential lots. The Riverview Terrace PUD was originally approved by the Board of Supervisors on October 5, 1978 for 262 single family lots with associated open space. A final map for all 262 lots was subsequently approved and recorded on May 10, 1979. In reviewing the proposed Conceptual Map, staff determined that any additional subdivision of existing lots within the Riverview Terrace PUD would require an amendment to the PUD.

DISCUSSION:

A PUD is an area of land controlled by a landowner, which is to be developed as a single entity for a number of dwelling, commercial, and/or industrial units, the plan for which does not correspond in lot size, height, or size of dwelling, density, lot coverage and required open space of the regulations established in any one use district.

The Riverview Terrace PUD amendment will allow for a total of five single family residential lots consistent with the underlying zoning of Single Family 21,000 – Planned Unit Development. As stated in the background section above, two single family lots currently exist and are proposed to be split into a total of five. This will bring the overall lot count of the Riverview Terrace PUD to

265. The new proposed lots range in size from 21,278 to 32,919 square feet (average 26,781 square feet). As the additional lots are proposed within the existing area of the PUD, no modification to the open space provided with the original approval will occur. New lots within the existing area do not trigger a requirement for additional open space in a PUD. This is only a requirement when the overall size of the project changes.

The proposed lots are subject to the Hillside Development ordinance, as the average slope of is more than 15 percent. With the map provided, the applicant has demonstrated that development of the lots will occur in areas with an average slope of 11 percent, leaving the steeper slope areas outside of developed areas.

The applicant proposes to construct single story homes consisting of either three or four bedrooms, and ranging in size from 1,741 square feet to 1,938 square feet, with some possible variation to fit the building envelopes of the lots.

In reviewing the proposed PUD amendment, staff determined that some of the lots exceed the maximum allowed depth of 240 feet for the SF21 zoning district. In the most significant case, the proposed lot depth of approximately 380 feet exceeds the maximum allowed by 140 feet. As a result, a variance request has been incorporated into this amendment. Staff supports the approval of this variance for several reasons. The first is because the lot depth previously existed within the PUD on the subject parcels, creating a situation where the applicant is merely perpetuating an existing lot dimension condition. The second is because the topography of the rear of the lots is relatively steep; creating a hardship for the applicant that makes only approximately half of the lots developable. And finally, because the lots are within a PUD, which allows for different lot sizes and dimensions than those of the underlying zoning district.

Planned Unit Development Findings

Per CCMC Section 17.07.005 (Findings) and Section 17.09.050 (Approval or Denial of Application), the approval or denial of a PUD shall be based on the specific findings outlined below. Staff will first address the findings outlined in Section 17.07.005, followed by the findings outlined in Section 17.09.050.

Section 17.07.005 (Findings):

1. *Environmental and health laws and regulations concerning water and air pollution, the disposal of solid waste, facilities to supply water, community or public sewage disposal and, where applicable, individual systems for sewage disposal.*

   Development proposed with this PUD amendment will be required to obtain a dust control and stormwater pollution prevention permit from the Nevada Division of Environmental Protection (NDEP), and the site grading must incorporate proper dust control and erosion control measures. The new lots will also be required to connect to the City water and sewer system.

2. *The availability of water which meets applicable health standards and is sufficient in quantity for the reasonably foreseeable needs of the subdivision.*

   The project will connect to the City water system, which has sufficient quantity for the foreseeable needs of the additional lots. Sufficient water resources are addressed through the Growth Management building permit allocation system and other ongoing water management efforts.

3. *The availability and accessibility of utilities.*

The new lots are within a previously developed area with all public utilities available for connection.

4. *The availability and accessibility of public services such as schools, police protection, transportation, recreation and parks.*

The new lots are within a previously developed area with existing service from schools, police, transportation, recreation and parks.

5. *Access to public lands. Any proposed subdivision that is adjacent to public lands shall incorporate public access to those lands or provide an acceptable alternative.*

The lots are adjacent to Carson City Open Space property to the north. Access to the public land will remain unchanged within the Riverview Terrace PUD as a result of the development of the new lots.

6. *Conformity with the zoning ordinance and land use element of the City's Master Plan.*

The proposed development is consistent with the zoning ordinance and the land use element of the City's Master Plan.

7. *General conformity with the City's Master plan for streets and highways.*

The proposed development meets the City's Master plan for streets and highways.

8. *The effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision.*

The existing public streets are adequate to accommodate the minimal traffic that will be generated by the proposed additional lots.

9. *The physical characteristics of the land such as flood plains, earthquake faults, slope and soil.*

The project is located in an area subject to the Hillside Development ordinance and is also located within close proximity of an earthquake fault. Conditions of approval have been recommended, where applicable, to address potential concerns related to these issues.

10. *The recommendations and comments of those entities reviewing the subdivision request pursuant to NRS 278.330 thru 278.348, inclusive.*

The recommendations of reviewing departments and other entities have been incorporated into the conditions of approval for the proposed subdivision, as applicable.

11. *The availability and accessibility of fire protection including, but not limited to, the availability and accessibility of water and services for the prevention and containment of fires including fires in wild lands.*

Fire protection for the proposed lots is available and accessible.

12. *Recreation and trail easements.*

Recreation and trail easements are not proposed with the addition of three lots to the existing PUD. The Carson City Open Space program owns and maintains trails directly adjacent to the proposed lots, providing adequate recreation opportunities.

Section 17.09.050 (Approval or Denial of PUD Application):

1. *In what respects the plan is or is not consistent with the statement of objectives of the Planned Unit Development ordinance.*

The new lots proposed with this modification to the existing Riverview Terrace PUD are consistent with the lots approved originally.

2. *The extent to which the plan departs from zoning and Planned Unit Development regulations otherwise applicable to the property, including but not limited to density, size and use, and the reasons such departures are or are not deemed to be in the public interest.*

The proposed plan does depart from zoning regulations otherwise applicable to the property, as discussed in the Variance section of this staff report. The reason for departure can be deemed to be in the public interest because it addresses a hardship due to the topography of the lots.

3. *The purpose, location and amount of the open space in the Planned Unit Development, the reliability of the proposals for maintenance and conservation of the open space and the adequacy or inadequacy of the amount and purpose of the open space as related to the proposed density and type of residential development.*

Approximately 105 acres, or 44 percent of the original Riverview Terrace PUD is open space. No modification to the existing open space is proposed or required for the addition of the new lots.

4. *A physical design of the plan and in the manner in which such design does or does not make adequate provision for public services, provide adequate control over vehicular traffic, parking requirements, and further the amenities of light and air, recreation and visual enjoyment.*

The proposed amendment is specific to lots within a previously developed area. Provisions for public services, vehicular traffic, parking, light and air, recreation and visual enjoyment were addressed through previous approvals.

5. *The relationship, beneficial or adverse, of the proposed Planned Unit Development to the neighborhood in which it is proposed to be established.*

The proposed amendment for three additional lots within the PUD is consistent with the development standards of the existing Riverview Terrace PUD and will be a beneficial addition to the neighborhood.

6. *In the case of a plan which proposes a development over a period of years, the sufficiency of the terms and conditions intended to protect the interest of the public and the residents of the Planned Unit Development in the integrity of the plan.*

Development over a large period of years is not anticipated, as only five lots are proposed.

With the recommended conditions of approval, the findings to grant approval have been met by the applicant. Therefore, it is recommended that the Planning Commission approve application TPUD-17-053 based on the required findings as noted above.

PUBLIC COMMENTS: Public notices were mailed on May 12, 2017 to 39 adjacent property owners within 600 feet of the subject site pursuant to the provisions of NRS and CCMC. As of the completion of this staff report, no comments have been received regarding the proposed project. Any written comments that are received after this report is completed will be submitted prior to or at the Planning Commission meeting on May 31, 2017 depending on their submittal date to the Planning Division.

OTHER CITY DEPARTMENT OR OUTSIDE AGENCY COMMENTS: Comments were received from various city departments and are outlined below. Recommendations have been incorporated into the recommended conditions of approval, where applicable.

Engineering Division:

The Engineering Division has reviewed the application within our areas of purview relative to adopted standards and practices and to the provisions of CCMC 17.07.005. The Engineering Division offers the following condition of approval:

1. All construction and improvements must meet the requirements of Carson City Standard Details, including CCDS Division 7, Hillside Development.

2. A drainage easement must be provided along the slope cut-off ditch west of the building pads.

3. The slope cut-off ditch west of the building pads must drain to the Hells Bells Road right-of-way drainage system. Any portion of this ditch that cannot drain to this right-of-way must be properly designed to promote sheet flow at the outfall and prevent erosion. Drainage onto adjacent property may not exceed pre-development runoff quantities. Any outfalls must be riprapped or otherwise protected from erosion.

4. The east property line, along Hells Bells Road, must be adjusted to follow the logical right-of-way alignment.

5. Per the Preliminary Geotechnical Report, a final geotechnical report must be prepared that addresses the proposed structures and related site development. The report must include allowable bearing capacity, estimated settlement under design loads, foundation grading criteria, slope design, erosion control criteria, and other site specific or specialized geotechnical information as needed.

Building Division:

No comments.

Fire Department:

1. The project must comply with the 2012 IFC and northern Nevada fire code amendments.

2. The project must comply with the 2012 IWUIC and northern Nevada fire code amendments due to being under the hillside development ordinance.

Parks, Recreation and Open Space:

1. The Unified Pathway Master Plan identifies the concrete path along Hells Bells Road as part of the City's path system connecting the Moffat Open Space Property to the north end of the Prison Hill Recreation Area. This facility needs to remain open and in place during any construction on the parcels. Any damage due to construction related activities must be repaired to the City's satisfaction.

2. The parcels abut Carson City Open Space property. All construction activities shall remain on the subject parcels and must not impact and/or damage any area or natural vegetation on the Open Space property.

3. The applicant will be required to provide a staging plan that reflects all construction related parking. All vehicles shall remain on the subject parcels or along Hells Bells Road. Vehicles will not be allowed to utilize the Moffat Open Space property's gravel parking lot or the adjacent open space areas.

4. The applicant and or future homeowner(s) of lot #5, will be responsible for the removal of any graffiti on the 7 foot high retaining wall. It is recommended that the applicant's contractor apply an anti-graffiti coating to the wall to facilitate future removal of any tagging.

5. The applicant will be required to construct the 7 foot high retaining wall on lot # 5 with gray and/or natural hue colors to mitigate visual impacts from the Moffat Open Space property and to blend with the surrounding natural environment.

6. It will be the applicant's and or future homeowner(s) responsibility to maintain all open space/natural areas and provide defensible space associated with each parcel in the development.

7. The applicant will be required to incorporate "best management practices" into their construction documents and specifications to reduce the spread of noxious weeds. Our department is willing to assist the applicant with this aspect of their project.

School District:

No comments received.

Environmental Control Division:

No comments.

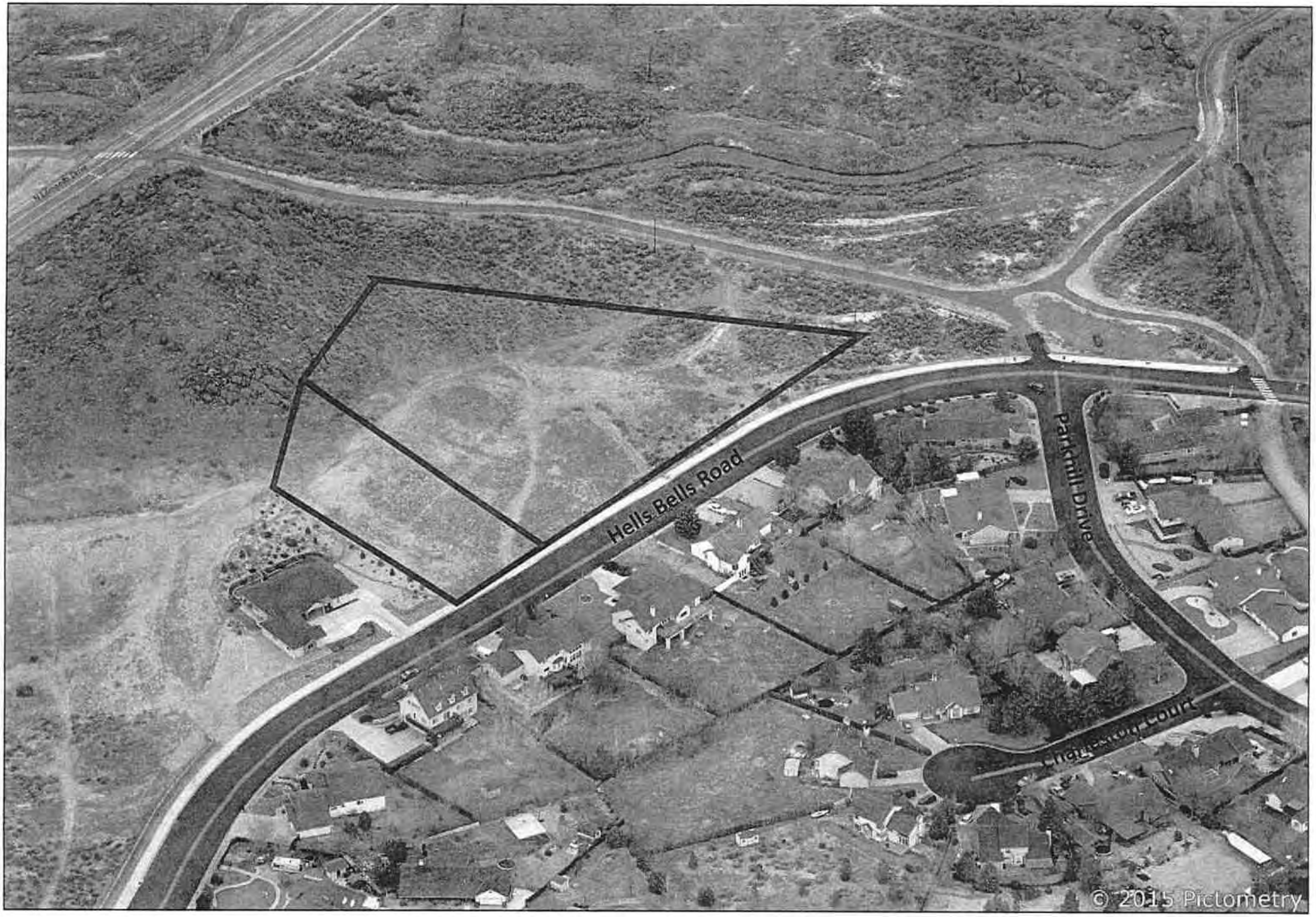
Health and Human Services:

No comments received.

Attachments

Aerial Photo
City Comments
Application (TPUD-17-053)

Riverview Terrace PUD Amendment—Subject Parcels



Riverview Terrace PUD Amendment—Subject Parcels

Engineering Division
Planning Commission Report
File Number TPUD-17-053

TO: Hope Sullivan - Planning Department

FROM Stephen Pottéy – Development Engineering Department

DATE: May 23, 2017 **MEETING DATE:** May 31, 2017

SUBJECT TITLE:

Action to consider an application for an amendment to the Riverview Terrace PUD to divide two parcels into five, apns 010-361-05&06.

RECOMMENDATION:

The Engineering Division has no preference or objection to the special use request.

CONDITIONS OF APPROVAL:

The Engineering Division has reviewed the application within our areas of purview relative to adopted standards and practices and to the provisions of CCMC 17.07.005. The Engineering Division offers the following condition of approval:

- All construction and improvements must meet the requirements of Carson City Standard Details, including CCDS Division 7, Hillside Development.
- A drainage easement must be provided along the slope cut-off ditch west of the building pads.
- The slope cut-off ditch west of the building pads must drain to the Hells Bells Road right-of-way drainage system. Any portion of this ditch that cannot drain to this right-of-way must be properly designed to promote sheet flow at the outfall and prevent erosion. Drainage onto adjacent property may not exceed pre-development runoff quantities. Any outfalls must be riprapped or otherwise protected from erosion.
- The east property line, along Hells Bells Road, must be adjusted to follow the logical right-of-way alignment.
- Per the Preliminary Geotechnical Report, a final geotechnical report must be prepared that addresses the proposed structures and related site development. The report must include allowable bearing capacity, estimated settlement under design loads, foundation grading criteria, slope design, erosion control criteria, and other site specific or specialized geotechnical information as needed.

FINDINGS:

The following Tentative Map Findings by the Engineering Division are based on approval of the above conditions of approval:

1. *Environmental and health laws and regulations concerning water and air pollution, the disposal of solid waste, facilities to supply water, community or public sewage disposal and, where applicable, individual systems for sewage disposal.*
   The existing infrastructure has been found sufficient to supply the water and sanitary sewer needs of the subdivision, and the City has the capacity to meet the water and sewer demand.

2. *The availability of water which meets applicable health standards and is sufficient in quantity for the reasonably foreseeable needs of the subdivision.*
   The City has sufficient capacity to meet the water demand of the subdivision.

3. *The availability and accessibility of utilities.*
   Water and sanitary sewer utilities are available and accessible.

4. *The availability and accessibility of public services such as schools, police protection, transportation, recreation and parks.*
   The road network necessary for the subdivision is available and accessible.

5. *Access to public lands. Any proposed subdivision that is adjacent to public lands shall incorporate public access to those lands or provide an acceptable alternative.*
   Development engineering has no comment on this finding.

6. *Conformity with the zoning ordinance and land use element of the city's master plan.*
   Development engineering has no comment on this finding.

7. *General conformity with the city's master plan for streets and highways.*
   The development is in conformance with the city's master plan for streets and highways.

8. *The effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision.*
   The existing infrastructure is sufficient to meet the additional demand imposed by the subdivision.

9. *The physical characteristics of the land such as flood plains, earthquake faults, slope and soil.*
   The site is near an active earthquake fault and neat a FEMA flood zone AE, however these hazards are far enough away from the proposed building pads that they will have no negative impact on development.

10. *The recommendations and comments of those entities reviewing the subdivision request pursuant to NRS 278.330 thru 278.348, inclusive.*
    Development engineering has no comment on this finding.

11. *The availability and accessibility of fire protection including, but not limited to, the availability and accessibility of water and services for the prevention and containment of fires including fires in wild lands.*

The subdivision has sufficient secondary access, and sufficient fire water flows.

12. *Recreation and trail easements*.
    Development engineering has no comment on this finding.

These comments are based on the tentative map plans and reports submitted. All applicable code requirements will apply whether mentioned in this letter or not.

May 8, 2017

Fire

Comments for TPUD 17-053:

1. Project must comply with the 2012 IFC and northern Nevada fire code amendments.
2. Project must comply with the 2012 IWUIC and northern Nevada fire code amendments due to being under the hillside development ordinance.

Dave Ruben
Fire Marshal
Carson City Fire Department
777 S. Stewart Street
Carson City, NV 89701

Direct 775-283-7153
Main 775-887-2210
FAX 775-887-2209

May 10, 2017

TPUD-17-053

Parks

The Parks, Recreation & Open Space Department has the following comments on the above referenced Tentative Planned Unit Development:

1) The Unified Pathway Master Plan identifies the concrete path along Hells Bells Road as part of the City's path system connecting the Moffat Open Space Property to the north end of the Prison Hill Recreation Area. This facility needs to remain open and in place during any construction on the parcels. Any damage due to construction related activities must be repaired to the City's satisfaction.
2) The parcels abut Carson City Open Space property. All construction activities shall remain on the subject parcels and must not impact and/or damage any area or natural vegetation on the Open Space property.
3) The applicant will be required to provide a staging plan that reflects all construction related parking. All vehicles shall remain on the subject parcels or along Hells Bells Road. Vehicles will not be allowed to utilize the Moffat Open Space property's gravel parking lot or the adjacent open space areas.
4) The applicant and or future homeowner(s) of lot #5, will be responsible for the removal of any graffiti on the 7 foot high retaining wall. It is recommended that the applicant's contractor apply an anti-graffiti coating to the wall to facilitate future removal of any tagging.
5) The applicant will be required to construct the 7 foot high retaining wall on lot # 5 with gray and/or natural hue colors to mitigate visual impacts from the Moffat Open Space property and to blend with the surrounding national environment.
6) It will be the applicant's and or future homeowner(s) responsibility to maintain all open space/natural areas and provide defensible space associated with each parcel in the development.
7) The applicant will be required to incorporate "best management practices" into their construction documents and specifications to reduce the spread of noxious weeds. Our department is willing to assist the applicant with this aspect of their project.

Thank you,
Vern & Patti

Patti Liebespeck
Office Specialist
Carson City Parks, Recreation & Open Space
3303 Butti Way, Bldg 9
Carson City, NV 89701
Phn: (775) 887-2262 x 7342
Fax: (775) 887-2145
pliebespeck@carson.org
www.carson.org

NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

STATE OF NEVADA
Department of Conservation & Natural Resources
Brian Sandoval, Governor
Bradley Crowell, Director
Greg Lovato, Administrator

May 12, 2017

LEE PLEMEL
PLANNING DIVISION
108 E. PROCTOR
CARSON CITY NV 89701

Re: Tentative Map - Riverview Terrace
5 lots in Carson City

Dear Mr. PLEMEL:

The Nevada Division of Environmental Protection has reviewed the above referenced subdivision and recommends approval of said subdivision with respect to water pollution and sewage disposal, provided that Carson City commits to provide sewage service to said subdivision.

Please note that if the developer of this subdivision will disturb more than one acre, he/she is required to obtain coverage under NDEP's Construction Stormwater General Permit NVR100000. A Notice of Intent must be filed electronically and submitted with a $200 fee prior to commencing any earth-disturbing activities at the site. Visit NDEP's Bureau of Water Pollution Control's website at: http://ndep.nv.gov/bwpc/storm_cont03.htm for more information about this permit.

Sincerely,

Ryan Fahey, Staff Engineer
Technical Services Branch
Bureau of Water Pollution Control

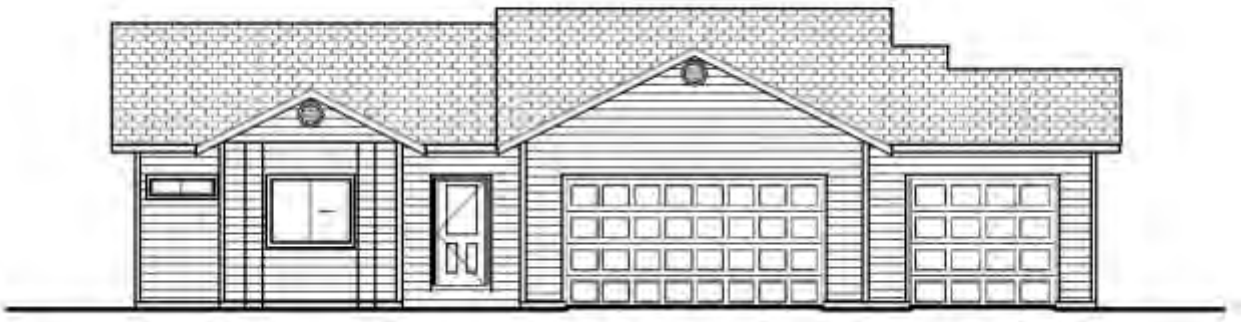
cc:
Engineer: MANHARD CONSULTING 3476 Executive Way, Ste. 12, Carson City, NV 89706
Developer: Liberty Homes, LLC PO Box 1856, Gardnerville, NV 89410

Control No. 11222

RIVERVIEW TERRACE PUD AMENDMENT

Tentative Map for a PUD

April 2017



Prepared For:

Liberty Homes L.L.C.

2457 Juniper Road Gardnerville, NV 89410

Prepared By:

Manhard CONSULTING

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PROJECT LOCATION

The project site (APNs 10-361-05 and 10-361-06) is 3.074 acres and is located within the existing Riverview Terrace PUD, on Hells Bells Road north of 5th Street. The total acreage of Riverview Terrace PUD is approximately 237 acres, which includes +/- 105 acres of open space and +/- 132 acres of residential use (including right-of-way). The site is south of the Moffat Open Space property; it is surrounded on the north and west by open space property and by single family residential in the approved Riverview Terrace PUD to the south and east.

Figure 1: Project Location (http://ccapps.org/publicgis/)

EXISTING SITE CONDITIONS

The two existing parcels are undeveloped. The site is characterized by typical Northern Nevada native vegetation. The project site is located in steeply to moderately slope area with bedrock outcrops present along the westerly side of the parcels. The slope calculation for the project is eighteen (18%) at

the widest point of developable area. Since the average slope will not exceed thirty-three (33%) percent, and because this is submitted as a TPUD Application, there is no requirement for a special use permit, in accordance with Carson City Municipal Code Section 18.08.030. Associated reports and plans are included in this TPUD Application.

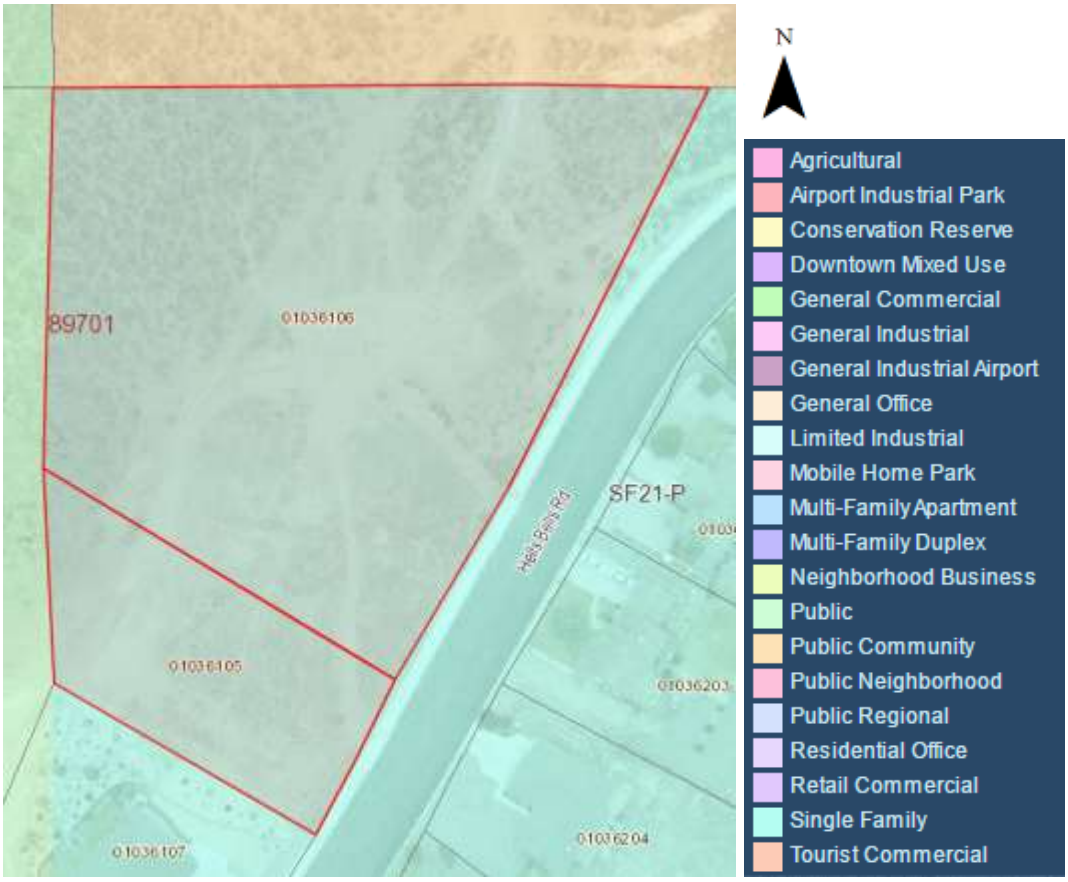
The site is bounded to the southeast by Hells Bells Road. Utilities are stubbed onto both of the existing parcels, which include telephone, water, and power. Sewer and water at a minimum are located in Hells Bells Road. No significant surface drainages cross the site. Topography of the site consists of moderate to gentle slopes that generally are down to the southeast. Elevations range from approximately 4,628 feet to approximately 4,655 feet above mean sea level.

EXISTING MASTER PLAN & ZONING DESIGNATIONS

The two parcels have a Master Plan designation of Low Density Residential and a zoning designation of Single Family 21,000 (SF21-P). They are located in the Riverview Terrace Planned Unit Development.

Figure 2: Existing Master Plan Designation

Figure 3: Existing Zoning Designation (http://ccapps.org/publicgis/)



SURROUNDING PROPERTIES

The surrounding property designations are as follows:

Figure 4: Surrounding Property Designations

Direction	Current Zoning	Master Plan Zoning	Current Land Use
North	Public Community	Open Space	Undeveloped
East	Single Family 21,000 (PUD)	Low Density Residential	Single Family Residential
South	Single Family 21,000 (PUD)	Low Density Residential	Single Family Residential
West	Public	Public/Quasi Public	Undeveloped

APPLICATION REQUEST

The enclosed application is a request to:

1. **Amend the Riverview Terrace Planned Unit Development by approving a "Tentative Map for a Planned Unit Development" to create three (3) new parcels.**

PROJECT DESCRIPTION

The proposed lots are located at 4044 and 4080 Hells Bells Road in the Riverview Terrace PUD. The parcels have a Master Plan designation of Low Density Residential and are zoned Single Family 21,000 (SF21-P). The project is a PUD Tentative Map that will divide APNs 10-361-05 and -06 (.637 and 2.437 acres, respectively) into five lots that meet the underlying SF21 zoning (three new parcels). Because the lots were originally created (5/10/1979) through a PUD map, staff has advised that the process for creating these three new lots is to amend the PUD through a Tentative Map. The proposed lot sizes range from 21,278 to 32,919 sq. ft., with an average lot size of 26,781 sq. ft., which meet the requirements of the underlying SF21 zoning designation. The property is currently undeveloped.

The five proposed lots meet the underlying zoning of SF21 and comply with most of the site development standards in the Carson City Municipal Code (CCMC Section 18.04.190), including minimum parcel area, maximum density, minimum lot width, maximum height, setbacks, and use within the SF21 zoning regulations. The project does not meet the development standard of maximum lot depth because the existing PUD created a non-conforming lot that exceeds the maximum lot depth. The Tentative Map does not expand the non-conformance.

The project site is within the boundaries of the Riverview Terrace PUD. However, there are no associated density requirements, development standards or a Development Agreement with Riverview Terrace PUD. Rather, Riverview Terrace PUD was approved based on the underlying zoning at that time (1978) and a water agreement that guaranteed water and sewer hook ups for 262 lots. As part of the PUD, approximately 105 acres of open space (Riverview Park and the Mexican Ditch) was also dedicated to the City.

As part of the history of Riverview Terrace PUD, a Parcel Map was filed for Riverview Terrace PUD Parcel B in 1988, creating 4 residential lots. Based on staff's interpretation at that time, it was determined at that time that a PUD amendment was not necessary, and that it was appropriate to file a Parcel Map to create the new parcels in lieu of amending the PUD.

DENSITY ANALYSIS

A Density Analysis comparing the existing and proposed acreage, number of residential parcels, typical lot size, and density is provided below. The total size of the PUD is not proposed to change. The Density Analysis below shows a 1.176% increase in density over the +/- 237-acre project area (includes Riverview Park and the Mexican Ditch). Overall, there is a 1.13% decrease in the average lot size (including right-of-way) and a 1.19% decrease in density throughout the PUD. However, it is important to note that this amendment will only impact the 3.074-acre project site; there are no proposed changes to the remaining lots already approved in the PUD. All of the proposed lots meet the underlying SF21 zoning designation.

Figure 5: Density Analysis

	Existing	Proposed	Change
Acreage	+/- 237 acres	Unchanged	No change- the 3.074 acres represents 1.3% of the PUD area.
Residential Acreage	+/- 132 Acres including ROW	+/- 132 Acres including ROW	No change
Open Space	+/- 105 Acres	+/- 105 Acres	No change
Residential Parcels	262	265 (3 new lots)	1.145% increase in # of parcels
Average Lot Size	21,946 sq. ft. * including ROW (132 acres/262 lots)	21,698 sq. ft. (132 acres/265 lots)	1.13% decrease in average lot size
Density	.504 units/acre	.498 units/acre	1.19% decrease in density

* The typical lot size in the existing PUD is +/- 1/3 acre (14,000 sq. ft.).

PUD Statement of Objectives (CCMC 17.09.005, 17.09.090, 17.09.095, 17.09.100)

The PUD Ordinance is being utilized as the vehicle to approve this PUD amendment; many of the responses are based off the entire Riverwalk Terrace PUD that was approved in 1978, rather than simply the proposed amendment area. The Riverview Terrace PUD was approved on October 5, 1978 and recorded May 10, 1979, before the PUD Ordinance existed. It was approved based on an agreement that guaranteed water and sewer hook ups for 262 units. The project site has a current zoning designation of SF21; the five proposed lots meet the underlying zoning of SF21 and comply with most of the site development standards in the Carson City Municipal Code (CCMC Section 18.04.190), including minimum parcel area, maximum density, minimum lot width, maximum height, setbacks, and use within the SF21 zoning regulations. The project does not meet the development standard of maximum lot depth because the existing PUD created a non-conforming lot that exceeds the maximum lot depth. The Tentative Map does not expand the non-conformance.

A review of the current PUD Standards follow, to demonstrate the PUD's relationship to city standards of open space, access to light and air, pedestrian and vehicular circulation, and producing a variety of land uses which complement each other and harmonize with the existing and proposed land uses in the vicinity.

Open Space

Because this project is an amendment to an existing, approved PUD, no additional public open space is provided beyond what was approved in the original PUD. A review of the minutes (attached) show that a "proposed park had been considered by the Park and recreation Commission… the park was accepted" and that it was required that "development of the park to conform to the submitted plans prior to dedication to Carson City." Riverview Park is a 100-acre natural area with dirt trails traversing the area and going along the river. The Mexican Ditch Right-of-Way (+/- 5 acres, 100'-wide) traverses the property and a bridle path was also required to be included.

The CCMC currently requires that 30% of the project area must be dedicated as open space. The Riverview Terrace PUD exceeds this requirement, although it was adopted before the PUD Ordinance was in place.

Figure 6: Open Space Calculation

Open Space Required per CCMC	Required Open Space per CCMC	Public Open Space provided in existing Riverview Terrace PUD
30% of project	71.1 Acres (30% of 237 Acres)	105 Acres (44.3% of PUD)

Hydrology

The existing flows discharge to the curb and gutter network in Hells Bells Road and flow in a northern direction to the regional drainage system and on to the Carson River. Proposed drainage for the developed site will be contained in property swales and end up in the curb and gutter network of Hells Bells Road, flowing to the same outlet area as the existing conditions (northerly direction on to the regional drainage system and on to the Carson River).

Water Supply

Water service within the Riverview Terrace PUD is provided by Carson City Water and Sewer utilities. Water mains have been analyzed to determine the system capacity to provide adequate flows. The five proposed lots will connect to the existing municipal water system that is located in Hells Bells Road immediately adjacent to the project site. The existing water main in Hells Bells Road is an 8" line. It is estimated that the proposed units will require a total of 3.04 GPM of demand. East lot will be served by an individual service line and water meter.

Sewer Impact

Sanitary sewer disposal for Riverview Terrace PUD is provided by Carson City Water and Sewer Utilities. The five proposed lots will connect to the existing municipal sewer system that is located in Hells Bells Road immediately adjacent to the project site. The existing sewer main in Hells Bells Road is an 8" line. Each proposed lot will connect to the existing sewer main with an individual lateral.

Analysis of PUD Design Standards

The Carson City Municipal Code Section 17.09.095 Specific Design Standards regulates the specific design of the PUD. Section 17.09.100 regulates Open Space. The Table below identifies how each standard is addressed. The Riverview Terrace PUD was adopted before the PUD Ordinance was adopted.

Figure 7: Analysis of PUD Design Standards (CCMC 17.09.095)

Specific Design Standard	Code Requirement	How Addressed
Minimum Site Area	Shall not be less than 5 acres	The Riverview Terrace PUD is a total of 237 acres, including the 105 acres of open space.

Minimum Number of Units	Shall not be less than 5 dwelling units	There are 262 approved units in the Riverview Terrace PUD. This amendment proposes 3 additional parcels.
Minimum Lot Area	None	The proposed parcels meet the requirements of the underlying zoning designation of SF21 (21,000 s.f minimum parcel area)
Minimum Lot Width and Setbacks	None	The proposed parcels meet the requirements of the underlying zoning designation of SF21 (lot width-80', 20' front setback, 10' side, 15' street side, 20' rear).
Parking Standards: Division 2- Parking and Loading	2 spaces per dwelling units	A minimum of 2 garage spaces are provided for each new dwelling unit (10 stalls)
Storage Areas	Storage areas may be provided in the plan. Storage areas shall be screened from adjacent streets and commercial and residential properties to a height of 6 feet. No storage of items above 6 feet.	No storage areas are requested.
Sidewalks	Sidewalks may be required on private streets; however, sidewalks shall be required in and (adjacent) to open space areas.	Sidewalks are already constructed within the Riverview Terrace PUD and were in conformance with Carson City requirements at the time of construction.
Separate Services	Whenever more than one dwelling unit is contained within a building… Separate services shall be provided to each dwelling unit.	N/A: Only one dwelling unit per building is proposed.
Utilities	Underground utilities required	Utilities are already underground in the development.
Landscaping	Landscaping plans are required and shall meet Carson City standards	Carson City standards do not require landscaping plans for single family homes. No landscaping plans are proposed.
Bike Paths	May be required to be incorporated into the overall development of the plan in accordance with the Carson City unified pathways master plan.	There are existing trails in the Moffat Open Space, Riverview Park, and the Mexican Ditch. No additional bike paths are proposed.
Wellhead Protection and Watershed Protection: Chapter 12.05	Any new parcels created shall have a minimum size of 3 acres if individual sewage disposal systems are proposed to be utilitzed.	The parcels create will connect to the existing sewer lines in Hells Bells Road, which connect to the Carson City sewer system. No individual sewage disposal systems are proposed.

Drainage	Required by the development engineering department.	The drainage system is already established in the approved PUD and was in conformance with Carson City requirements at the time of construction. Drainage plans are included in the Tentative Map set for the amended project area that meet the requirements of the development engineering department.
Fire Hydrants and Lanes	Shall be provided and installed as required by the fire department.	Fire hydrants and lanes already exist in the Riverview Terrace PUD and were in conformance with Carson City requirements at the time of construction.
Open Space	Set aside a minimum of 30 percent of the gross area of the site for open space.	Open Space was not a condition of the approved PUD, although 105 acres of open space (44.3% of PUD) was provided. No additional open space is provided with this amendment. Please see above for extended discussion on the Open Space provided with the approved PUD.

Hillside Development

The project has been designed in accordance with Carson City Municipal Code Chapter 18.08, Hillside Development. The slope calculation for the developable site in accordance with Carson City Municipal Code Division 7, Section 7.8, is eighteen percent (18%). Since the average slope will not exceed thirty-three (33%) percent, and because this is submitted as a TPUD Application, there is no requirement for a special use permit. Associated reports and plans are included in this TPUD Application.

The Carson City Hillside Development Ordinance, Division 7, includes standards and requirements designed to minimize the potential of hillside development that could cause or contribute to landslides, erosion, sedimentation, deforestation, flooding, and/or the aesthetic degradation of the City's natural environment. It is applicable to development sites with an average 15% slope or more.

An analysis of the Hillside Development Manual is included below:

Figure 8: Analysis of Hillside Development Manual

Specific Design Standard	Code Requirement	How Addressed
7.3.1 Project Engineer Responsibilities	a. It is the responsibility of the project engineer to prepare a grading plan; to incorporate into the grading plan all recommendations contained in the soils, geology, and hydrology reports that may be required by the building department; to inspect and certify all	The project engineer has prepared a grading plan that incorporates all recommendations contained in the soils,

	grading operations; and to certify that the work was completed in accordance with the approved grading plans upon the completion of the project. b. Prior to and during grading operations, all necessary reports, compaction data, soils, geology and hydrology recommendations must be submitted by the project engineer to the building department. c. The project engineer must make an immediate written report, with recommended corrective measures to the building department, if the engineer discovers that the work on a hillside is below the standards required by this ordinance or by the approved final grading plan. d. If the project engineer, soils engineer, geologist, or hydrologist of record ceases his or her professional services on a hillside project, the grading work must be halted until the replacement engineer has agreed to accept the responsibility for certification of the work. e. Upon completion of all development related to the development of a single parcel and prior to issuance of a certificate of occupancy, the project engineer shall certify to the building department that all work was performed in accordance with approved plans. f. The city engineer may approve procedures for securing financial instruments in order to secure improvements not completed prior to occupation.	geology, and hydrology reports and is in conformance with the Carson City Municipal Code. Remaining requirements will be addressed during construction as necessary.
7.3.2 Drainage	a. Curb, gutter, and pavement design must insure that water on roadways is prevented from flowing off the roadway in an uncontrolled fashion. b. Natural drainage-ways must be riprapped or otherwise stabilized below drainage and culvert discharge points for a distance sufficient to convey the discharge without channel erosion. c. Waste material from construction, including soil and other solid materials, may be deposited within the 100 year floodplain, only after strict compliance with the provisions of Title 12 of the flood protection ordinance of the Carson City Municipal Code. d. The overall drainage system must be completed and made operational at the earliest possible time during construction. e. Alterations of Federal Emergency Management Agency (FEMA) defined flood-ways are prohibited except in accordance with the provisions of Title 12 of the Carson City Municipal Code.	A Drainage Plan is included in the Tentative Map Set that is in conformance with the Carson City Municipal Code. Remaining requirements will be addressed during Final Map preparation or construction as necessary.
7.3.3 Grading Plans	a. A grading plan which complies with this section and Appendix J, Chapter 18, of the Building Code as currently adopted by Carson City, must be prepared by a professional engineer and submitted with	The project engineer has prepared a grading plan that incorporates all recommendations

	development applications. b. Development on slopes in excess of 33% or more, as determined by the provisions of this section, shall be strongly discouraged and will require a special use permit. The special use permit process allows the consideration of these sites on a case-by-case basis, providing for a mechanism in which a development proposal must be justified prior to approval. c. Material necessary for filling purposes must come from a source permitted under an approved grading plan or as permitted by the extraction operation of the Carson City Municipal Code Title 18, Section 18.14. d. A re-vegetation and slope stabilization plan, as defined in 7.3.4 of this section, must be submitted with the grading plan. e. Cuts and fills must be rounded off in order to avoid the appearance of scarring.	contained in the soils, geology, and hydrology reports and is in conformance with the Carson City Municipal Code. It has been submitted with this TPUD Application. The Slope Map demonstrates that slopes are not in excess of 33%. A revegetation and slope stabilization plan is submitted with the grading plan in compliance the Carson City Municipal Code.
7.3.5 Topographic Mapping	A topographic map of the area proposed for development shall be submitted in accordance with the CCMC. The topographic map must include the surrounding area within 20 feet of the proposed project site; be drawn to a standard engineering scale with a minimum contour interval of 5 feet; illustrate drainage areas subject to inundation by the 10 year flood as identified by FEMA, or identification of the 100 year flood for drainage not previously mapped by FEMA; identification of rock outcroppings; identification of skyline areas for the purpose of this section; and identification of geologic faults and/or areas subject to any other geologic hazard.	A topographic map of the project area has been submitted in conformance with the Carson City Municipal Code.
7.3.6 Driveways and Parking	a. Combinations of collective private driveways, clustered parking areas, and on-street parallel parking bays are encouraged, provided they meet applicable fire department standards, to optimize the objectives of minimum soil disturbance, minimum impervious cover, excellence of design, and aesthetic sensitivity. b. Collective private driveways serving a maximum of 6 single family parcels are encouraged where their use will result in better building sites and less land coverage than would result if a public road were required. c. U-shaped driveways are encouraged to increase access and fire protection. d. The maximum slope on any driveway portion shall be 12%. e. The minimum width of a driveway shall be 12 feet. f. A driveway must be provided to a structure when	Private driveways are provided on each parcel that meet the requirements of the Carson City Municipal Code.

	access, as defined by the Fire Code as currently adopted by Carson City, is more than 150 feet from any exterior portion of the building. g. All driveways must be made of an all weather surface and must have a minimum vertical clearance of 13 feet, 6 inches. h. Driveways in excess of 150 feet in length must have turnarounds with an inside turning radius of not less than 30 feet and an outside radius of not less than 45 feet. Driveways in excess of 200 feet must be provided with turnouts at least 10 feet wide and 30 feet long. Driveway turnouts must be located as required by the Fire Chief.	
7.3.7 Utilities	a. All new permanent service utilities, both on-site and off-site, must be placed underground.	All service utilities are placed underground as shown on the utility plan.
7.4 Buildable Area	7.4.1 No development is permitted which significantly increases hazards of avalanche, rock fall landslide, flooding, or soil erosion. 7.4.2 The proposed building site, including driveway pads, shall be situated to keep environmental degradation and fire hazards to a minimum. 7.4.3 The disturbance of the existing hillside landscape shall be minimized by: a. Retaining trees and natural vegetation to the greatest extent possible while allowing for the required 30 foot defensible space; b. Providing a minimum of cuts and fills and earth grading; c. Blending graded areas with undisturbed natural terrain through the design of graded slopes; d. Minimizing the amount of exposed raw earth at any time in the project by careful phasing of the stages of construction; e. Requiring immediate replanting of areas disturbed by construction; f. Reducing the proposed depth of cuts and fills on hillsides to the greatest extent possible; g. Every effort should be taken in order to design foundations that step with the slope rather than flattening a site in order to create a pad.	Proposed building sites comply with the Carson City Municipal Code and are situated to keep environmental degradation and fire hazards to a minimum and minimize the disturbance of the existing hillside landscape.
7.5 Open space	7.5.1 It shall be strongly encouraged to preserve and/or protect rugged and steeply sloping terrain associated with slopes of 33% or more as undisturbed open space. 7.5.2 Open space areas and easements shall be placed in continuity with other surrounding open space areas in order to maximize the opportunity for the creation of trails and recreation areas.	The Riverview Terrace PUD was adopted before the PUD Ordinance was adopted. Open Space was not a condition of the approved PUD, although 105 acres of open space was provided. The open

	7.5.3 The scenic quality of hillsides shall be protected by: a. Preserving local natural landmarks such as rock outcrops or canyons, b. Preserving the cover of native vegetation as much as possible, c. Intensive replanting to hide or obscure manmade development, and d. By preserving natural drainage channels with devices, fixtures, swales, and retention areas to bring storm run-off into conformance with existing standards.	space provided with the original PUD approval complies with the Carson City Municipal Code.
7.6 Fire protection	7.6.1 Lot size and potential placement of structures shall be such that adequate clearance of hazardous, flammable vegetative cover may be accomplished. 7.6.2 All easements for firebreaks for safety of built-up areas shall encompass access for fire fighting personnel and equipment and such easements shall be dedicated for this specific purpose by being recorded. 7.6.3 All hillside development plans must provide for fire safety to reduce the spread of wildfire and reduce opportunity of ignition by: a. Providing fire lanes, fuel breaks, and non-combustible roofs and building materials, b. Use of spark arresters, c. Clearing of underbrush and excess vegetation near dwellings and by use of fire resistant local plant species. 7.6.4 Addresses and street name signs must be clearly visible and well posted. Use of at least four-inch high letters and/or numbers is strongly encouraged. 7.6.5 No structure may be located more than one thousand (1,000) feet from a water supply as measured along an unobstructed line of vehicular travel. 7.6.6 The use of non-treated wood shingles shall not be allowed as roofing materials in hillside areas. 7.6.7 In addition to the standards and requirements set forth above regarding fire protection, all development in hillside areas must comply with the most current guidelines related to prevention of wildfires in hillside areas as required by the Carson City Fire Department.	Lot sizes and potential placement of structures is in accordance with the Carson City Municipal Code. All requirements of the Carson City Fire Department are included in the Tentative Map Plan Set.
7.7 Maintenance	7.7.1 The owner of any private property on which grading or other work has been performed pursuant to a grading plan approved or a building permit granted under the provision of this chapter must continuously maintain and repair all graded surfaces and erosion prevention devices, retaining walls,	A note will be included on the Final Map as required.

	drainage structures or means, and other protective devices, plantings, and ground cover installed or completed.	
7.8 Additional requirements for parcel maps and subdivision maps	7.8.1 The following formula must be used to determine the average slope of land to be subdivided by subdivision map or parcel map: S = (0.0023)(I)(L) ÷ A where: S = Average percent slope, I = Contour interval in feet, L = Summation of length of contours in scale feet, A = Area in acres of parcel being considered. 7.8.2 Before any parcel map or tentative subdivision map is approved where a portion of which has an average slope of 15% or greater as defined in this section, the following requirements must be met. a. A slope analysis map indicating the average slopes on the parcel must be submitted. The slope analysis map is intended to provide the means to visually convey that the flatter portion of a parcel is being proposed for development of homes and the steeper portions remain open. The slope analysis map must indicate average slope by the following categories: 1. Areas of 15 to 19.9%, 2. Areas of 20 to 24.99%, 3. Areas of 25 to 33.99%, and 4. Areas of 33% or more. b. The proposed development must comply with the standards for drainage improvements, driveways and parking, slope stabilization, re-vegetation, placement of utilities, buildable area standards, open space, setbacks, grading, roadway design, construction standards, pedestrian facility provisions, access, height of structure, fire protection and maintenance of improvements as contained in this section. c. Every lot of a subdivision or parcel map must comply with the requirements of Section 18.08. 7.8.3 When designing subdivisions, there shall be a consideration of a reduced height limit on downslope lots fronting collector streets in order to provide unobstructed views of lower panoramic areas to be accomplished by requiring a maximum height of 15 to 20 feet at the property setback line. 7.8.4 In addition to the provisions of Title 17 and Title 18 of the Carson City Development Code, Carson City shall not approve a parcel map, or subdivision where the fire line water pressure is insufficient to the standards adopted by Carson City. 7.8.5 Provide infrastructure to rural standards rather than urban standards, as much as feasible, without	The Slope Analysis Map is included on the Tentative Map Plan Set, which indicates the average slope on each parcel. The proposed development complies with standards for drainage improvements, driveways and parking, slope stabilization, revegetation, placement of utilities, buildable area standards, open space, setbacks, grading, roadway design, construction standards, pedestrian facilities provision, access, height of structure, fire protection and maintenance of improvements as applicable.

	reducing safety or performance for vehicular and pedestrian circulation and for drainage and storm run-off. 7.8.6 Provide legal and financial mechanisms that assure future maintenance, repair, and replacement of hillside infrastructure whose cost is usually more expensive than similar facilities provided in conventional flatland development; and that assure areas set aside in subdivisions as permanent, undeveloped open space.	
7.9 Roadways	7.9.1 No grading, filling, clearing, or excavation of any kind is permitted until the final roadway grading plan is formally approved by the city engineer. 7.9.2 Fill areas must be prepared by removing organic material, such as vegetation and rubbish and any other material which is determined by the soils engineer to be detrimental to proper compaction or otherwise not conducive to stability. 7.9.3 All retaining walls or facings with a total vertical projection in excess of three feet (3') and associated with cut or fill surfaces shall be designed as structural members keyed into stable foundations and capable of sustaining the design loads. 7.9.4 Borrowing for fill is prohibited unless the material is obtained from a cut permitted under an approved grading plan, or imported from areas outside within Carson City; or subject to Title 18. 7.9.5 Roads must be designed to create the minimum feasible amount of land coverage and the minimum feasible disturbance to the soil. 7.9.6 Road alignment should follow natural terrain and no unnecessary cuts or fills are allowed in order to create additional lots or building sites. 7.9.7 Variations by city engineer in right-of-way standards are permitted to prevent the dedication of unnecessarily large parcels of land in accordance with the building department ordinance. 7.9.8 Variations by city engineer in road design and road construction are permitted in order to keep grading and cut-fill slopes to a minimum. 7.9.9 Roads in excess of two (2) travel lanes are not allowed. The width of two-lane roads must not exceed thirty-two feet (32') and must have a minimum width of twenty-six feet (26'). 7.9.10 One-way streets are permitted and encouraged where appropriate for the terrain and where public safety would not be jeopardized. The travel way must not exceed twenty feet (20') in width and may have curbs and sidewalks on one (1) side only.	N/A- no new roadways are proposed in this development. The roadway system is already constructed as part of the approved Riverview Terrace PUD.

	7.9.11 The width of the graded section must extend three feet (3') beyond the curb back or edge of pavement on both the cut and fill sides of the roadway. If sidewalks are to be installed parallel to the roadway, width of the graded section shall be increased by the width of the sidewalk plus one foot (1') beyond the curb back. 7.9.12 No roads are permitted on natural slopes in excess of fifteen percent (15%). 7.9.13 Cul-de-sacs shall be designed with a minimum radius of forty-five feet (45'). 7.9.14 The cross-slope of roads shall not exceed two percent (2%). 7.9.15 Two (2) roadway accesses must be provided in and out of developed areas. 7.9.16 Provide a buildable dwelling site on each lot by identifying a sufficiently sized and relatively level building area with enough stability and bearing capacity of geologic structures and soils to support a principal building, positioned on the lot, to be reasonably accessible from public streets.	
7.10 Setbacks	7.10.1 A thirty foot (30') defensible space setback shall be required as set forth in this section. 7.10.2 Accessory structures are not encouraged within the required setbacks. 7.10.3 Homes built at the top of a slope need a minimum setback of one hundred feet (100') from the edge of the slope with an additional thirty feet (30') for defensible space.	Appropriate setbacks are maintained on the proposed parcels in accordance with the Carson City Municipal Code.

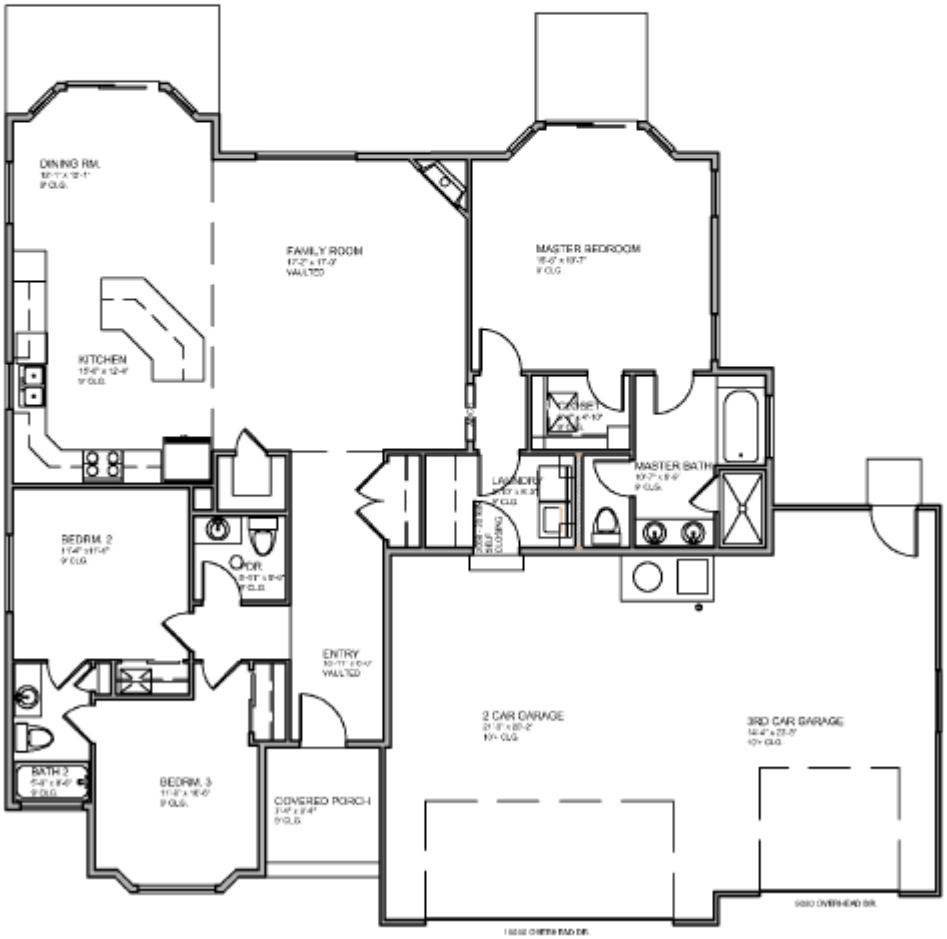
SAMPLE FLOOR PLANS AND ELEVATIONS

The applicant plans to construct homes sized from 1741 to 1938 square feet with some variations in the plans possible to fit the building envelopes of the lots. Model 1741 has two different roof styles; 1 hip roof with the ridge height of 19'-8" and one gable roof with a ridge height of 18'-10". Model 1938 has a hip roof with a ridge height of 17'-9".

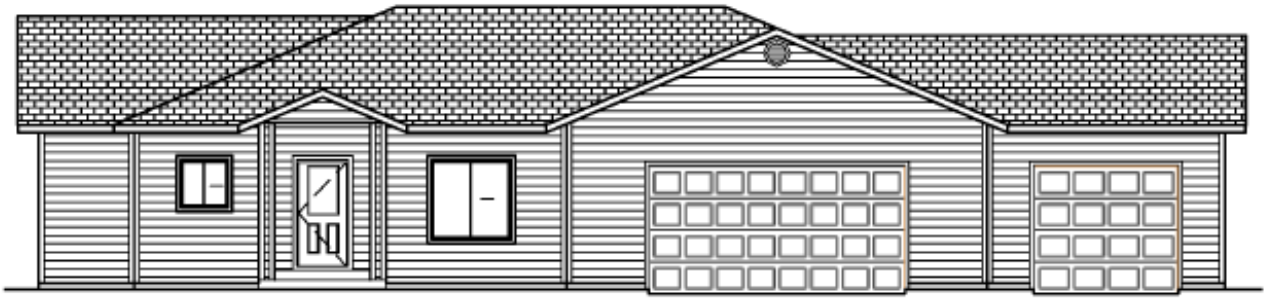
Figure 9: Sample Floor Plans and Elevations

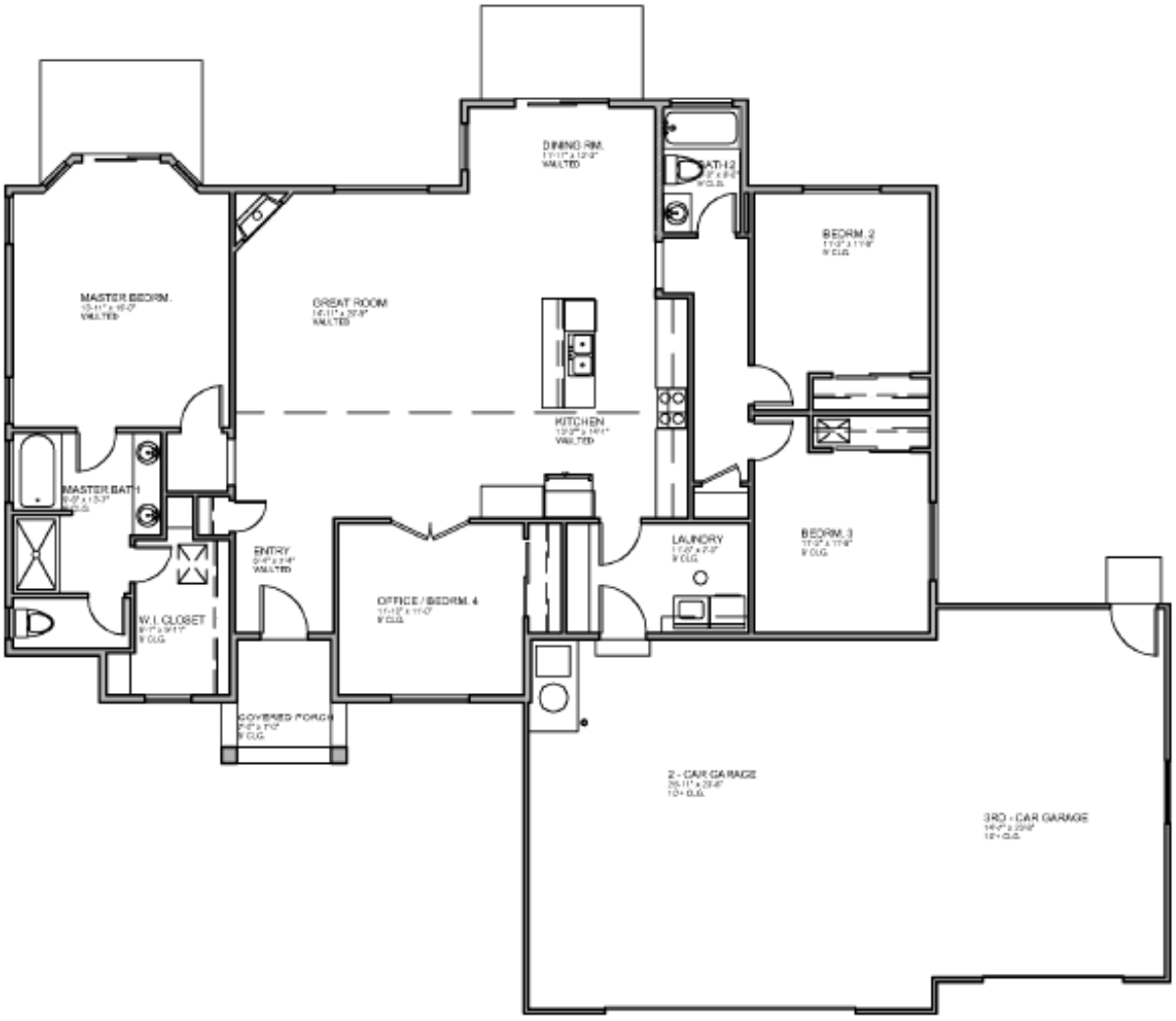
Model 1741- Gable Option

Model 1741- Hip Option



Model 1938




DINING RM.
MASTER BEDRM.
GREAT ROOM
KITCHEN
BEDRM. 2
BEDRM. 3
MASTER BATH
ENTRY
W.I. CLOSET
OFFICE / BEDRM. 4
LAUNDRY
COVERED PORCH
2 - CAR GARAGE
3RD - CAR GARAGE

MASTER PLAN POLICY CHECKLIST

The purpose of the Master Plan Policy Checklist is to provide a list of answers that address whether a development proposal is in conformance with the goals and objectives of the 2006 Carson City Master Plan that are related to this TPUD application. The project it is within the boundaries of an approved PUD. It accomplishes the following objectives:

Chapter 3: A Balanced Land Use Pattern

1. It is consistent with the Master Plan Land Use Map in location and density. (1.1a)
2. The project is located in an area served by urban services, is served by community water and wastewater facilities and is already served by existing infrastructure. (1.1b)
3. It meets the provisions of the Growth Management Ordinance. (1.1d, Municipal Code 18.12)
4. It provides pathway connections consistent with the adopted Unified Pathways Master Plan and maintains access to adjacent public lands. (1.4a)
5. It is located to be adequately served by city services including fire and sheriff services, and coordinated with the School District to ensure adequate provision of schools. (1.5d)
6. It provides a variety of housing models and densities within the urbanized area appropriate to the development size, location, and surrounding neighborhood context (pursuant to the approved Riverview Terrace PUD). (2.2a, 9.1a)
7. It protects environmentally sensitive areas through proper setbacks, dedication, or other mechanisms in accordance with Carson City Municipal Code standards. (3.1b)
8. The development will meet the requirements of the Hillside Ordinance. (3.2a)
9. The design provides multiple access points, maintains defensible space (for fires) and are constructed with fire resistant materials as required by Carson City Municipal Code. (3.3b)
10. It is sited outside the primary floodplain and away from geologic hazards area. (3.3d,e)
11. It provides for levels of services consistent with the Land Use designation and adequate for the proposed development (Land Use table descriptions).
12. Does not create land use conflicts as it is single family residential of similar density to the adjacent development in the existing Riverview Terrace PUD.
13. The site is not in an identified Specific Plan Area (SPA) (Land Use Map, Chapter 8).

Chapter 4: Equitable Distribution of Recreational Opportunities

1. Park facilities were provided with the Riverview Terrace PUD consistent with the City's adopted standards (4.1b,c).
2. Existing access points are provided to Moffat Open Space and Riverview Park the existing Riverview Terrace PUD.
3. The project is consistent with the Carson City Open Space Master Plan (4.3a)

Chapter 5: Economic Vitality

1. Riverview Terrace PUD incorporated public facilities and amenities that improve residents' quality of life (5.6a).
2. The project will not impact tourism, historic resources, or the downtown core in a meaningful way due to its location (5.4a, 5.6a, 5.6c)

Chapter 6: Livable Neighborhoods and Activity Centers

1. The project will promote variety and visual interest through the incorporation of varied lot sizes, building styles and colors, garage orientation, and other features in accordance with the Carson City Municipal Code (6.1b).

2. The project will provide variety and visual interest through the incorporation of well-articulated building facades, clearly identified entrances and pedestrian connections, landscaping and other features consistent with the Development Standards (6.1c).
3. It provides appropriate height, density, and setback transitions and connectivity to surrounding development to ensure compatibility with surrounding development for infill project (6.2a, 9.3b, 9.4a).
4. The proposed project is compatible with the surrounding development of residential homes.
5. The proposed project is not spot zoned. It is residential development among other areas of residential development and is compatible with existing development.

Chapter 7 A Connected City

1. The proposed project will allow for easy pedestrian and bicycle access to Moffat Open Space and Riverview Park. (11.2b)
2. The proposed project does not place burdens on the existing roads and will not add to vehicular traffic in the area. Five parcels (three new) does not require a traffic analysis. (11.2c)
3. It provides for appropriate pathways through the development and to surrounding lands, including parks and public lands, consistent with the Unified Pathways Master Plan (12.1a,c).

FINDINGS

In accordance with Carson City Municipal Code Section 17.07.005, this project has been designed to consider the following:

1. **Environmental and health laws and regulations concerning water and air pollution, the disposal of solid waste, facilities to supply water, community or public sewage disposal and, where applicable, individual systems for sewage disposal.**

   All environmental health laws and regulations regarding water, air pollution, and waste disposal will be incorporated into the proposed project.

2. **The availability of water which meets applicable health standards and is sufficient in quantity for the reasonably foreseeable needs of the subdivision.**

   Water is available to the site. It will be provided by Carson City and conform to the applicable health standards and fulfill quantity requirements for residences.

3. **The availability and accessibility of utilities.**

   Public utilities are currently available to serve the proposed project.

4. **The availability and accessibility of public services such as schools, police protection, transportation, recreation and parks.**

   Educational requirements will be met by Carson City School District. Police services will be provided by the Carson City Sheriff's Department. The Regional Transportation Commission is responsible for transportation in and around the project area. Carson City Parks Department will provide recreational and parks services.

5. **Access to public lands. Any proposed subdivision that is adjacent to public lands shall incorporate public access to those lands or provide an acceptable alternative.**

   The project site is adjacent to the Moffat Open Space area; a 20 acre open space area with dirt trails, scenic views, and a shade structure. There are existing paths to the existing public road system that incorporate public access to those lands.

6. **Conformity with the zoning ordinance and land use element of the city's master plan.**

   The proposed project is in conformance with the Master Plan designation of Low Density Residential and the current zoning designation of Single Family 21,000 (PUD). Proposed lot sizes range from 21,278 to 32,919 sq. ft., with an average lot size of 26,781 sq. ft.

7. **General conformity with the city's master plan for streets and highways.**

   The proposed project is in conformance with the Carson City streets and highways master plan. No street improvements are proposed.

8. **The effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision.**

   There will be three new lots that have access to the existing public streets. No new streets are needed to serve these lots. This project does not meet the requirements for a traffic study.

9. **The physical characteristics of the land such as flood plains, earthquake faults, slope and soil.**

   The physical characteristics of the site are suitable for development. The site is not in the flood plain. Topography of the site consists of moderate to general slopes (details in application). Development will comply with the Carson City Hillside Ordinance. Soil conditions are similar to the adjacent existing development. There is a known potentially active fault (>35,000 years old) that runs northeast to southwest on the western edge of the parcels, however, a site specific fault investigation for the fault is not recommended. See attached Geotech Report.

10. **The recommendations and comments of those entities reviewing the subdivision request pursuant to NRS 278.330 thru 278.348, inclusive.**

    All recommendations and comments provided during the review of this project will be incorporated where applicable.

11. **The availability and accessibility of fire protection including, but not limited to, the availability and accessibility of water and services for the prevention and containment of fires including fires in wild lands.**

    The availability and accessibility of fire protection to the proposed residential units will be in compliance with Carson City Fire Department recommendations.

12. **Recreation and trail easements.**

    Recreation and trail easements are not applicable to this subdivision.

Carson City Planning Division
108 E. Proctor Street • Carson City NV 89701
Phone: (775) 887-2180 • E-mail: planning@carson.org

FILE # TPUD - 17 -

APPLICANT **PHONE #**
Liberty Homes LLC/Christian Funk 775-690-4206

MAILING ADDRESS, CITY, STATE, ZIP
PO Box 2388 Gardnerville, NV 89410

EMAIL
libertyhomesnv@gmail.com

PROPERTY OWNER **PHONE #**
Vernon C. Lee Family Trust

MAILING ADDRESS, CITY, STATE, ZIP
1680 West Street, Concord, CA 94521

EMAIL

APPLICANT AGENT/REPRESENTATIVE **PHONE #**
Manhard Consulting/ Keith Shaffer & Karen Downs 775-782-5050

MAILING ADDRESS, CITY, STATE, ZIP
3476 Executive Pointe Way, Suite 12 Carson City, NV 89706

EMAIL
kshaffer@manhard.com / kdowns@manhard.com

Project's Assessor Parcel Number(s)
10-361-05, 10-361-06

Project's Street Address
4044, 4080 Hells Bells Road

Nearest Major Cross Street(s)
Hells Bells Road/5th Street

Project's Master Plan Designation
Low Density Residential

Project's Current Zoning
SF-21P

Project Name
Riverview Terrace PUD Amendment

FOR OFFICE USE ONLY:

CCMC 17.07 and 17.09

TENTATIVE MAP FOR A PLANNED UNIT DEVELOPMENT

FEE*: $3,450.00 + noticing fee
*Due after application is deemed complete by staff

☐ **SUBMITTAL PACKET – 4 Complete Packets (1 Unbound Original and 3 Copies) including:**
- ☐ Application Form including Applicant's Acknowledgment
- ☐ Property Owner Affidavit
- ☐ Copy of Conceptual Planned Unit Development Letter
- ☐ Detailed Written Project Description
- ☐ Building Elevations
- ☐ Master Plan Policy Checklist
- ☐ Draft CC&Rs
- ☐ Wet Stamped Tentative Map (24" x 36")
- ☐ Reduced Tentative Map (11" x 17")
- ☐ Conceptual Drainage Study
- ☐ Geotechnical Report
- ☐ Traffic Study (if applicable)
- ☐ Documentation of Taxes Paid to Date

☐ **CD or USB DRIVE with complete application in PDF**

☐ **STATE AGENCY SUBMITTAL including:**
- ☐ 2 Wet-stamped copies of Tentative Map (24" x 36")
- ☐ Check made out to NDEP for $400.00 + $3/lot
- ☐ Check made out to Division of Water Resources for $180.00 + $1/lot

Application Reviewed and Received By:

_____

Submittal Deadline: See attached Planning Commission application submittal schedule.

Note: Submittals must be of sufficient clarify and detail for all departments to adequately review the request. Additional information may be required.

Total Project Area	Number of Lots	Smallest Parcel Size
3.074 Acres	5 total (3 new parcels)	21,278 sq. ft.

Please provide a brief description of your project below including specific modifications to Carson City's land use regulations requested as a part of this application. Provide additional pages to describe your request in more detail.

Amendment to the Riverview Terrace PUD to divide 2 existing parcels into 5 parcels. See attached detailed description.

NOTE: If your project is located within the Historic District or airport area, it may need to be scheduled before the Historic Resources Commission or the Airport Authority in addition to being scheduled for review by the Planning Commission. Planning staff can help you make this determination.

ACKNOWLEDGMENT OF APPLICANT: (a) I certify that the foregoing statements are true and correct to the best of my knowledge and belief; (b) I agree to fulfill all conditions established by the Board of Supervisors.

Applicant's Signature _____ Date 4-2-17

PROPERTY OWNER'S AFFIDAVIT

I, Jackie Eklund executor of Vernon Lee family trust, being duly deposed, do hereby affirm that I am the record owner of the
(Print Name)

subject property located at 4044 & 4080 Hells Bells Rd, Carson City, NV 89701, and that I have knowledge of, and I agree to, the
(Property Address and APN)

filing of this Tentative Planned Unit Development application. APN 010-361-06 & APN 010-361-05

Jackie Eklund — 1680 West St Concord CA 94521 — 3/13/17
Signature — Address — Date

Use additional page(s) if necessary for other names.

STATE OF NEVADA)
COUNTY)

On March 13th, 2017, personally appeared before me, a notary public, Jackie Eklund, personally known (or proved) to me to be the person whose name is subscribed to the foregoing document and who acknowledged to me that he/she executed the foregoing document.

Mary Phillips
Notary Public

MARY PHILLIPS
Notary Public - California
Contra Costa County
Commission # 2172275
My Comm. Expires Nov 18, 2020

- ☐ Topography at 2.5-foot contour intervals for slopes of less than 15 percent and 5-foot contour intervals for slopes of greater than 15 percent, identifying areas with 15 percent or greater slope, areas with 33 percent or greater slope and areas identified as "Skyline" on the adopted Carson City Skyline Map. The location of natural features including trees may be required.
- ☐ Proposed lot layout, lot sizes and setbacks. Blocks and parcels are to be numbered consecutively and the dimensions of all parcels are to be shown.
- ☐ Typical lot detail.
- ☐ Height, size, location and use of all structures, walls and fences.
- ☐ Location and size of proposed parks, common areas and/or open space and amount of recreational improvements. Where applicable, indicate private versus common open space areas.
- ☐ Conceptual landscape plan.
- ☐ Proposed circulation system showing all public and private streets, sidewalks, and bikeways, the width of all streets, typical street cross sections, location of adjoining streets (with street names), sidewalks and bikeways.
- ☐ Proposed parking.
- ☐ Proposed boat and/or RV parking, if applicable.
- ☐ Layout of proposed water, sewer and storm drainage facilities.
- ☐ Location of all natural drainages shown.
- ☐ Show 100-year floodplain, as determined by FEMA Flood Insurance Maps or recognized methods, for those areas subject to flooding.
- ☐ Show earthquake fault lines through the proposed development with building setbacks from fault line as recommended by a geotechnical study.
- ☐ Grading plan for the site (including streets) meeting Carson City Development Standards and requirements showing all cuts, fills and retaining walls.
- ☐ Erosion control plan including stream protection, road drainage, erosion prevention and prevention of untreated discharge to streams, if applicable.
- ☐ All existing and proposed easements.

☐ Conceptual Drainage Study per Carson City Development Standards Sections 14.6 and 14.8. Contact Development Engineering at (775) 887-2300 for additional information.

☐ Geotechnical Report including soil types, seasonal high water table and percolation rates.

☐ Traffic Study per Carson City Development Standards Section 12.13.1 (if applicable).

☐ Documentation of property taxes paid to date on all parcels associated with the proposed project.

STATE AGENCY SUBMITTALS

To assure the necessary reviews are completed, the Planning Division will submit the Tentative Planned Unit Development Map on your behalf to the Nevada Division of Environmental Protection and the Nevada State Division of Water Resources.

To complete these submittals, we will require two wet-stamped copies of the Tentative Planned Unit Development Map and payment of the State fees at the time of the City application submittal. This can be handled by submitting two checks to the Planning Division office: one payable to NDEP for $400 per map plus $3.00 per lot; the second check payable to STATE WATER RESOURCES in the amount of $180 per map plus $1.00 per lot. The checks will be routed to the State offices with their copy of the Tentative Subdivision Map.

NOTE: Fees are subject to change. While Carson City makes every effort to keep this application up to date, it is the applicant's responsibility to ensure State agency checks submitted are for the current fee amounts.

Master Plan Policy Checklist

Conceptual & Tentative Subdivisions, PUD's & Parcel Maps

PURPOSE

The purpose of a development checklist is to provide a list of questions that address whether a development proposal is in conformance with the goals and objectives of the 2006 Carson City Master Plan that are related to subdivisions of property. This checklist is designed for developers, staff, and decision-makers and is intended to be used as a guide only.

Development Name: Riverview Terrace PUD Amendment

Reviewed By: _____

Date of Review: _____

DEVELOPMENT CHECKLIST

The following five themes are those themes that appear in the Carson City Master Plan and which reflect the community's vision at a broad policy level. Each theme looks at how a proposed development can help achieve the goals of the Carson City Master Plan. A check mark indicates that the proposed development meets the applicable Master Plan policy. The Policy Number is indicated at the end of each policy statement summary. Refer to the Comprehensive Master Plan for complete policy language.

CHAPTER 3: A BALANCED LAND USE PATTERN

The Carson City Master Plan seeks to establish a balance of land uses within the community by providing employment opportunities, a diverse choice of housing, recreational opportunities, and retail services.

Is or does the proposed development:

- ☑ Consistent with the Master Plan Land Use Map in location and density?
- ☑ Meet the provisions of the Growth Management Ordinance (1.1d, Municipal Code 18.12)?
- N/A Encourage the use of sustainable building materials and construction techniques to promote water and energy conservation (1.1e, f)?
- ☐ Located in a priority infill development area (1.2a)?
- ☑ Provide pathway connections and easements consistent with the adopted Unified Pathways Master Plan and maintain access to adjacent public lands (1.4a)? In approved PUD
- N/A Encourage cluster development techniques, particularly at the urban interface with surrounding public lands, as appropriate, and protect distinctive site features (1.4b, c, 3.2a)?

☒ N/A At adjacent county boundaries, coordinated with adjacent existing or planned development with regards to compatibility, access and amenities (1.5a)?

☑ Located to be adequately served by city services including fire and sheriff services, and coordinated with the School District to ensure the adequate provision of schools (1.5d)?

☒ N/A In identified Mixed-Use areas, promote mixed-use development patterns as appropriate for the surrounding context consistent with the land use descriptions of the applicable Mixed-Use designation, and meet the intent of the Mixed-Use Evaluation Criteria (2.1b, 2.2b, 2.3b, Land Use Districts, Appendix C)?

☑ Provide a variety of housing models and densities within the urbanized area appropriate to the development size, location and surrounding neighborhood context (2.2a, 9.1a)? Per Carson City Municipal Code

☑ Protect environmentally sensitive areas through proper setbacks, dedication, or other mechanisms (3.1b)? Per Carson City Municipal Code

☑ If at the urban interface, provide multiple access points, maintain defensible space (for fires) and are constructed of fire resistant materials (3.3b)?

☑ Sited outside the primary floodplain and away from geologic hazard areas or follow the required setbacks or other mitigation measures (3.3d, e)?

☑ Provide for levels of services (i.e. water, sewer, road improvements, sidewalks, etc.) consistent with the Land Use designation and adequate for the proposed development (Land Use table descriptions)?

☒ N/A If located within an identified Specific Plan Area (SPA), meet the applicable policies of that SPA (Land Use Map, Chapter 8)?

CHAPTER 4: EQUITABLE DISTRIBUTION OF RECREATIONAL OPPORTUNITIES

The Carson City Master Plan seeks to continue providing a diverse range of park and recreational opportunities to include facilities and programming for all ages and varying interests to serve both existing and future neighborhoods.

Is or does the proposed development:

☑ Provide park facilities commensurate with the demand created and consistent with the City's adopted standards (4.1b, c)? In approved PUD

☑ Consistent with the Open Space Master Plan and Carson River Master Plan (4.3a)?

CHAPTER 5: ECONOMIC VITALITY

The Carson City Master Plan seeks to maintain its strong diversified economic base by promoting principles which focus on retaining and enhancing the strong employment base, include a broader range of retail services in targeted areas, and include the roles of technology, tourism, recreational amenities, and other economic strengths vital to a successful community.

Is or does the proposed development:

☑ Incorporating public facilities and amenities that will improve residents' quality of life (5.5e)?

☒ N/A Promote revitalization of the Downtown core (5.6a)?

☒ N/A Incorporate additional housing in and around Downtown, including lofts, condominiums, duplexes, live-work units (5.6c)?

CHAPTER 6: LIVABLE NEIGHBORHOODS AND ACTIVITY CENTERS

The Carson City Master Plan seeks to promote safe, attractive and diverse neighborhoods, compact mixed-use activity centers, and a vibrant, pedestrian-friendly Downtown.

Is or does the proposed development:

☑ Promote variety and visual interest through the incorporation of varied lot sizes, building styles and colors, garage orientation and other features (6.1b)? Per Municipal Code

☒ N/A Provide variety and visual interest through the incorporation of well-articulated building facades, clearly identified entrances and pedestrian connections, landscaping and other features consistent with the Development Standards (6.1c)?

☑ Provide appropriate height, density and setback transitions and connectivity to surrounding development to ensure compatibility with surrounding development for infill projects or adjacent to existing rural neighborhoods (6.2a, 9.3b 9.4a)? Per Municipal Code

☒ N/A If located in an identified Mixed-Use Activity Center area, contain the appropriate mix, size and density of land uses consistent with the Mixed-Use district policies (7.1a, b)?

☒ N/A If located Downtown:

- ☐ Integrate an appropriate mix and density of uses (8.1a, e)?
- ☐ Include buildings at the appropriate scale for the applicable Downtown Character Area (8.1b)?
- ☐ Incorporate appropriate public spaces, plazas and other amenities (8.1d)?

CHAPTER 7: A CONNECTED CITY

The Carson City Master Plan seeks promote a sense of community by linking its many neighborhoods, employment areas, activity centers, parks, recreational amenities and schools with an extensive system of interconnected roadways, multi-use pathways, bicycle facilities, and sidewalks.

Is or does the proposed development:

☒ N/A Promote transit-supportive development patterns (e.g. mixed-use, pedestrian-oriented, higher density) along major travel corridors to facilitate future transit (11.2b)?

☑ Maintain and enhance roadway connections and networks consistent with the Transportation Master Plan (11.2c)? In existing, approved PUD

☑ Provide appropriate pathways through the development and to surrounding lands, including parks and public lands, consistent with the Unified Pathways Master Plan (12.1a, c)? In existing, approved PUD

CARSON CITY
Capital of Nevada

Treasurer Home | Assessor Data Inquiry | Back to Last Page

Secured Tax Inquiry Detail for Parcel # 010-361-06

Property Location: 4080 HELLS BELLS RD
Billed to: LEE, VERNON C FAM TRUST 4/9/96
% VERNON C LEE, TRUSTEE
1680 WEST ST
CONCORD, CA 94521-0000

Tax Year: 2016-17
Roll #: 009805
District: 2.1
Tax Service:
Land Use Code: 120

Code Table

Outstanding Taxes:

Prior Year	Tax	Penalty/Interest	Total	Amount Paid	Total Due
Current Year					**No Taxes Owing**
08/15/16	145.98		145.98	145.98	.00
10/03/16	145.00		145.00	145.00	.00
01/02/17	145.00		145.00	145.00	.00
03/06/17	145.00		145.00	145.00	.00
Totals:	**580.98**	**.00**	**580.98**	**580.98**	

Payment Cart | History

Additional Information

	2016-17	2015-16	2014-15	2013-14	2012-13
Tax Rate	3.5200	3.5200	3.5400	3.5600	3.5600
Tax Cap Percent	.2	3.2	3.0	4.2	6.4
Abatement Amount	147.17	84.46	45.57		

CARSON CITY
Capital of Nevada

Treasurer Home | Assessor Data Inquiry | Back to Last Page

Secured Tax Inquiry Detail for Parcel # 010-361-05

Property Location: 4044 HELLS BELLS RD
Billed to: LEE, VERNON C FAM TRUST 4/9/96
% VERNON C LEE, TRUSTEE
1680 WEST ST
CONCORD, CA 94521-0000

Tax Year: 2016-17
Roll #: 009804
District: 2.1
Tax Service:
Land Use Code: 120

Code Table

Outstanding Taxes:

Prior Year	Tax	Penalty/Interest	Total	Amount Paid	Total Due

Current Year					No Taxes Owing
08/15/16	127.49		127.49	127.49	.00
10/03/16	127.00		127.00	127.00	.00
01/02/17	127.00		127.00	127.00	.00
03/06/17	127.00		127.00	127.00	.00
Totals:	**508.49**	**.00**	**508.49**	**508.49**	

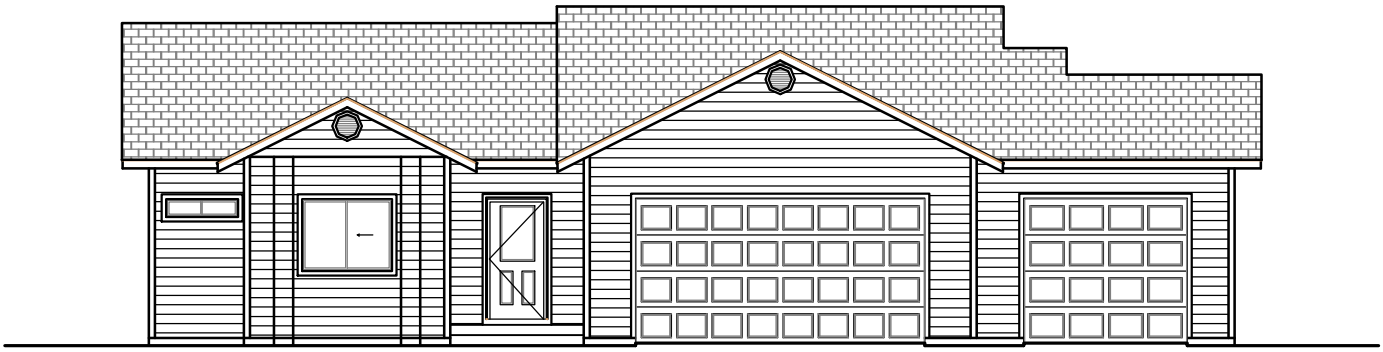
Payment Cart | History

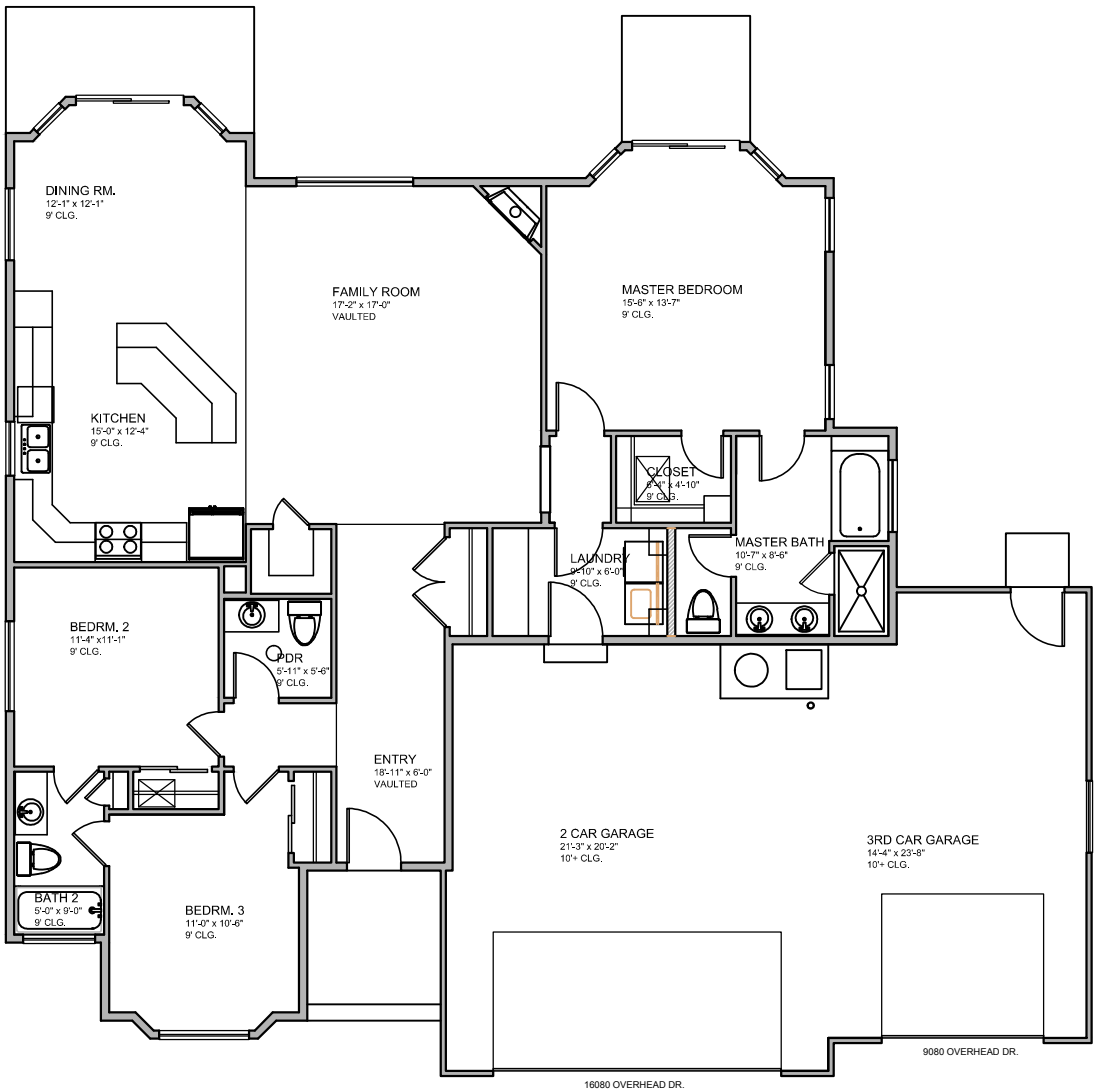
Additional Information

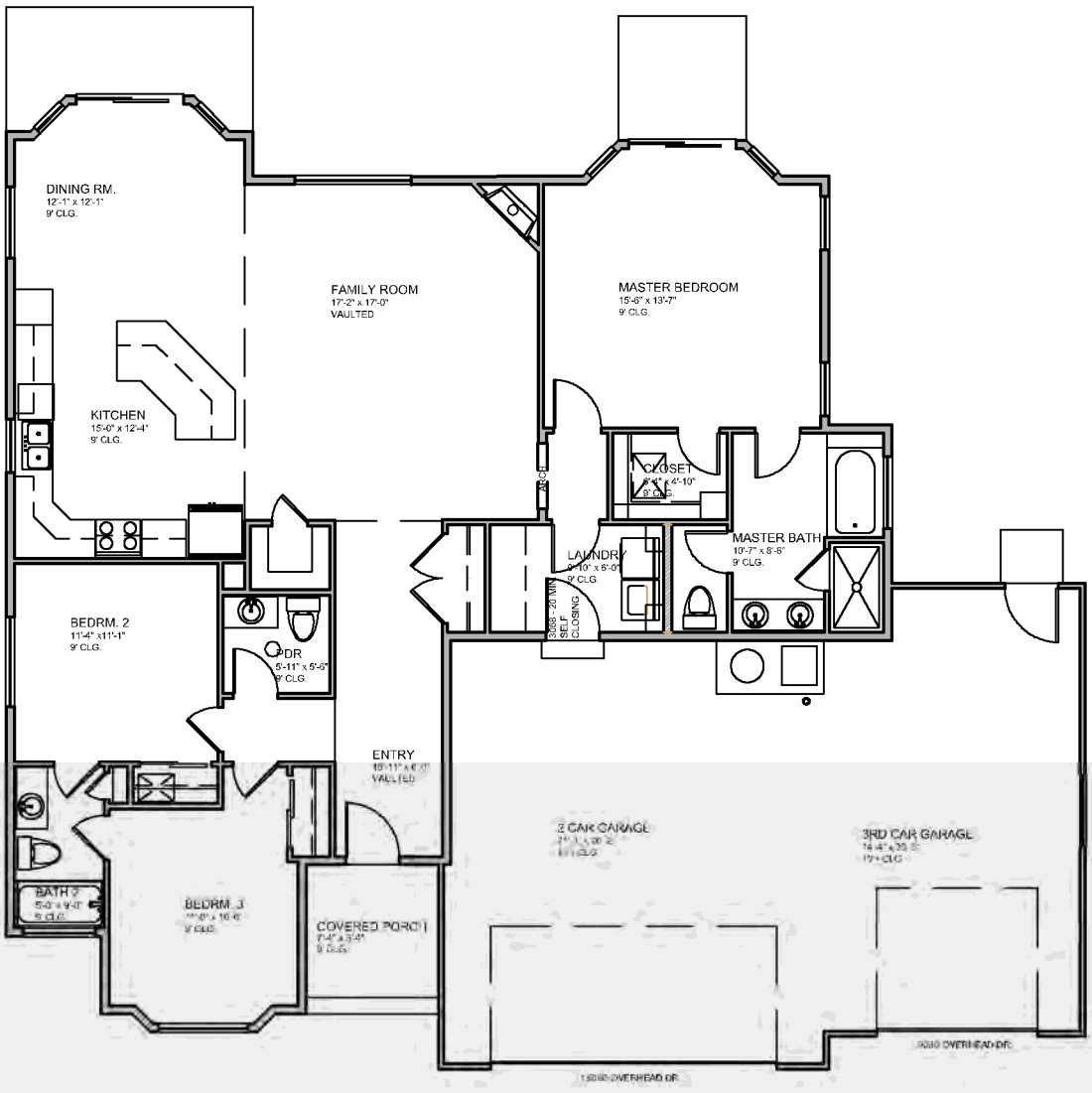
	2016-17	2015-16	2014-15	2013-14	2012-13
Tax Rate	3.5200	3.5200	3.5400	3.5600	3.5600
Tax Cap Percent	.2	3.2	3.0	4.2	6.4
Abatement Amount	182.70	73.90	39.85		

Conceptual PUD Letter

Carson City staff held a Conceptual PUD review meeting with the applicant and applicant's representatives on **April 10, 2017**. A Conceptual PUD letter has not yet been issued by Carson City. All comments received verbally at that meeting have been incorporated into this application submittal.




DINING RM.
12'-1" x 12'-1"
9' CLG.
FAMILY ROOM
17'-2" x 17'-0"
VAULTED
MASTER BEDROOM
15'-6" x 13'-7"
9' CLG.
KITCHEN
15'-0" x 12'-4"
9' CLG.
CLOSET
9' CLG.
LAUNDRY
9' CLG.
MASTER BATH
10'-7" x 8'-6"
9' CLG.
BEDRM. 2
11'-4" x11'-1"
9' CLG.
PDR
9' CLG.
ENTRY
18'-11" x 6'-0"
VAULTED
2 CAR GARAGE
21'-3" x 20'-2"
10'+ CLG.
3RD CAR GARAGE
14'-4" x 23'-8"
10'+ CLG.
BATH 2
9' CLG.
BEDRM. 3
11'-2" x 10'-6"
9' CLG.
9080 OVERHEAD DR.
16080 OVERHEAD DR.


DINING RM.
12'-1" x 12'-1"
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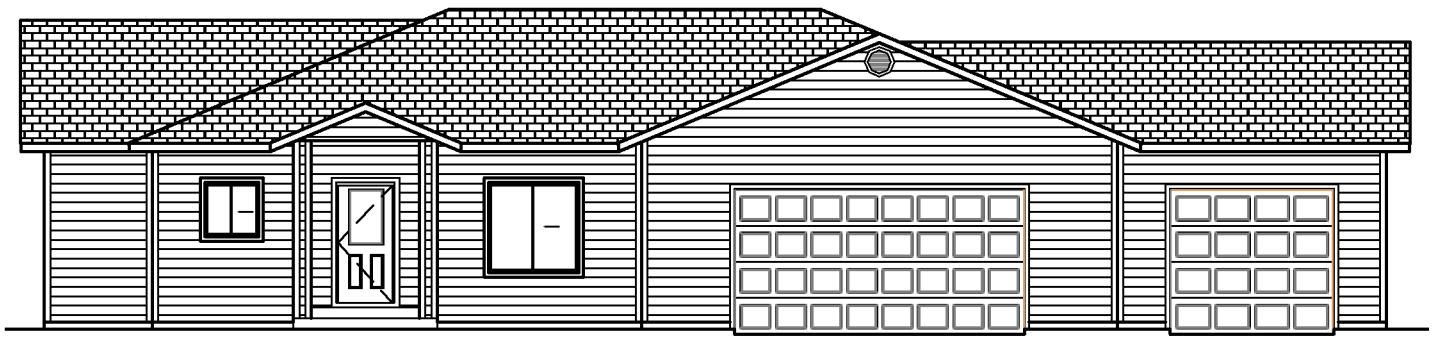
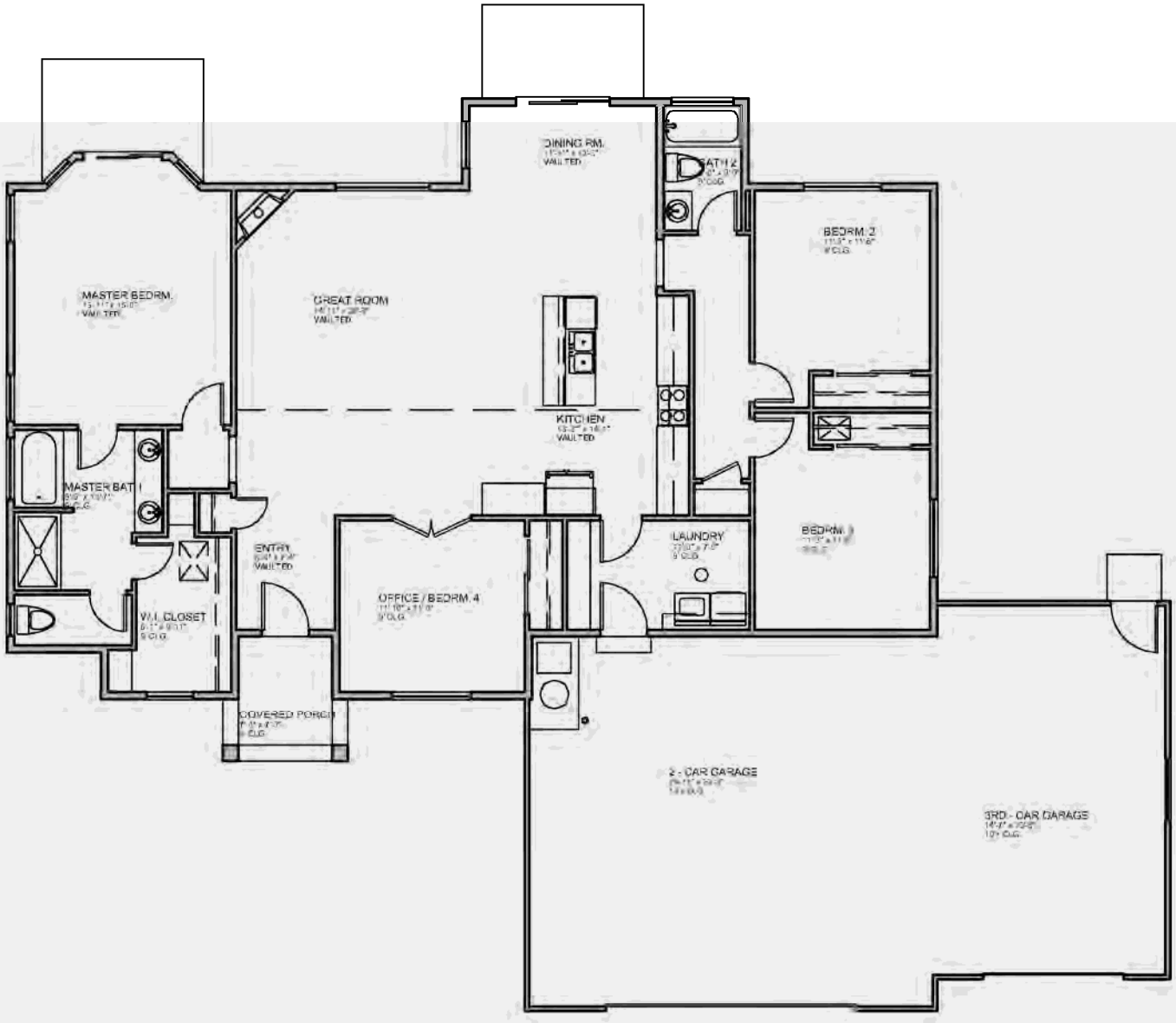
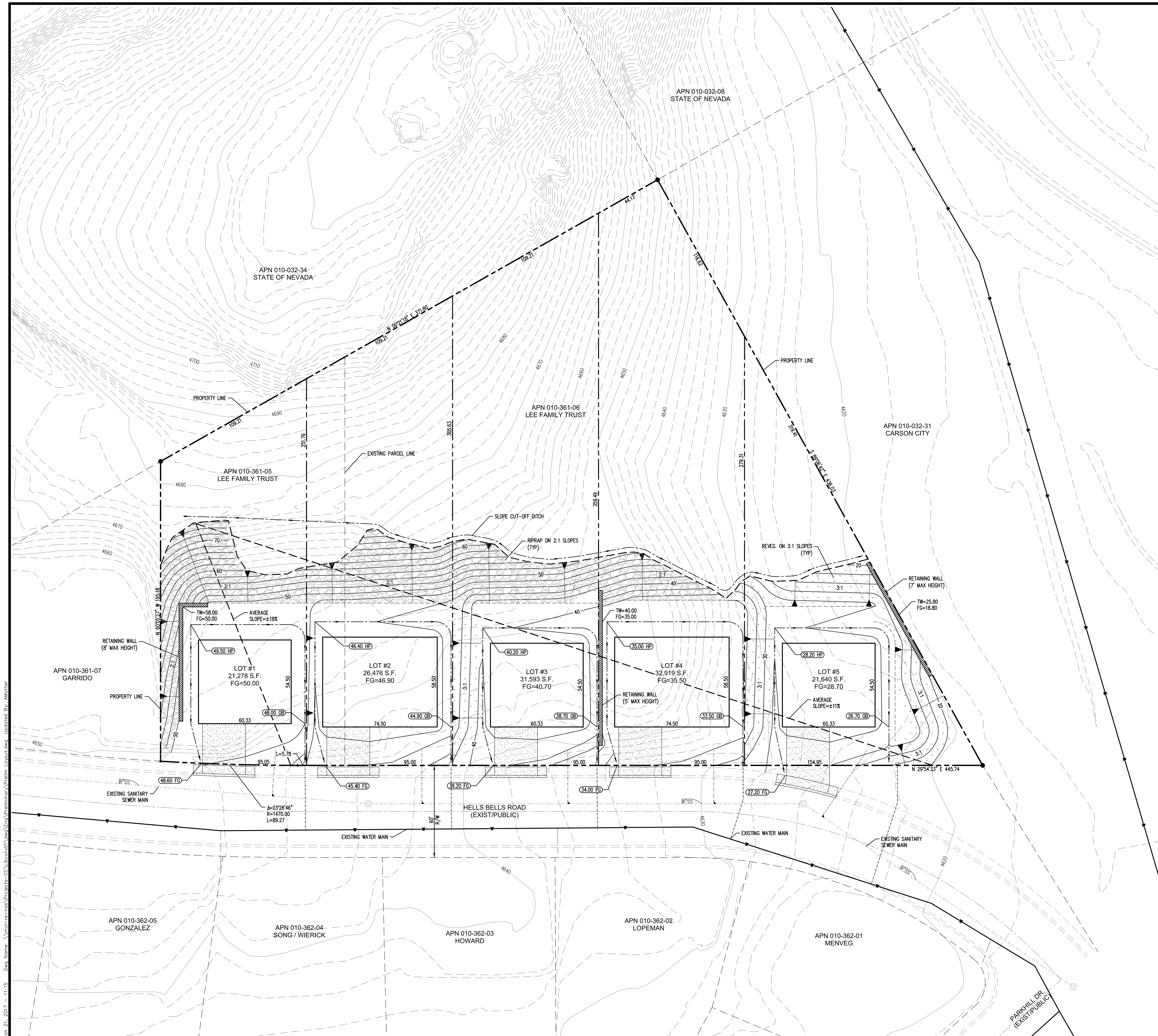
VAULTED
MASTER BEDROOM
15'-6" x 13'-7"
9' CLG.
KITCHEN
15'-0" x 12'-4"
9' CLG.
CLOSET
6'-4" x 4'-10"
9' CLG.
LAUNDRY
9'-10" x 6'-0"
9' CLG.
MASTER BATH
10'-7" x 8'-6"
9' CLG.
BEDRM. 2
11'-4" x11'-1"
9' CLG.
HDR
5'-11" x 5'-6"
9' CLG.
ENTRY
VAULTED
2 CAR GARAGE
3RD CAR GARAGE
BEDRM. 3
COVERED PORCH




DINING RM.
VAULTED
BATH 2
BEDRM. 2
MASTER BEDRM.
VAULTED
GREAT ROOM
VAULTED
KITCHEN
VAULTED
MASTER BATH
W.I. CLOSET
ENTRY
VAULTED
OFFICE / BEDRM. 4
LAUNDRY
BEDRM. 3
COVERED PORCH
2 - CAR GARAGE
3RD. CAR GARAGE



GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.

1"=30'

OWNER

VERNON C. LEE FAMILY TRUST
1680 WEST STREET
CONCORD, CA 94521

APPLICANT

LIBERTY HOMES LLC
P.O. BOX 1856
GARDNERVILLE, NV 89410

PROJECT DATA

PROJECT AREA .... 3.07± ACRES
LOT COUNT 5
AVERAGE LOT SIZE .... 26,781 S.F.
ZONING.. SF-21-P
FLOOD ZONE .... UNSHADED ZONE X

BASIS OF BEARINGS

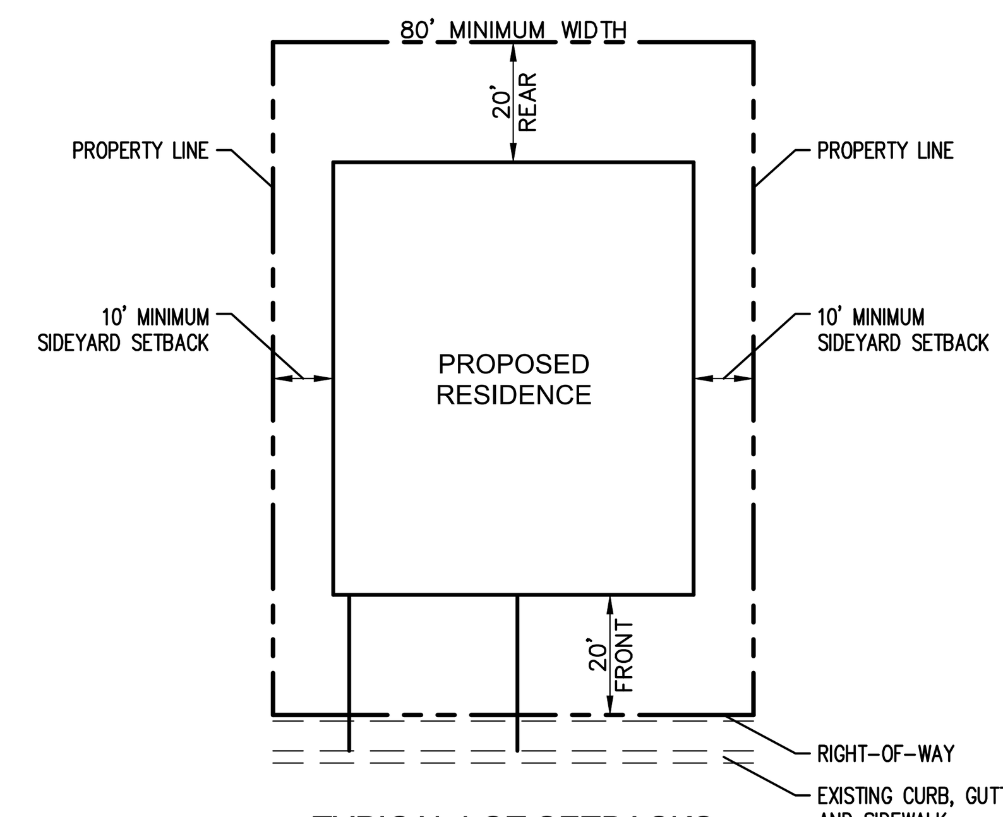
MODIFIED NEVADA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983/1994 (NAD 83/94) DETERMINED USING REAL TIME KINEMATIC GPS (RTK GPS) OBSERVATIONS OF CARSON CITY CONTROL MONUMENTS CC003 AND CCOO1 AS SHOWN ON THE RECORD OF SURVEY MAP #2749.

BASIS OF ELEVATION

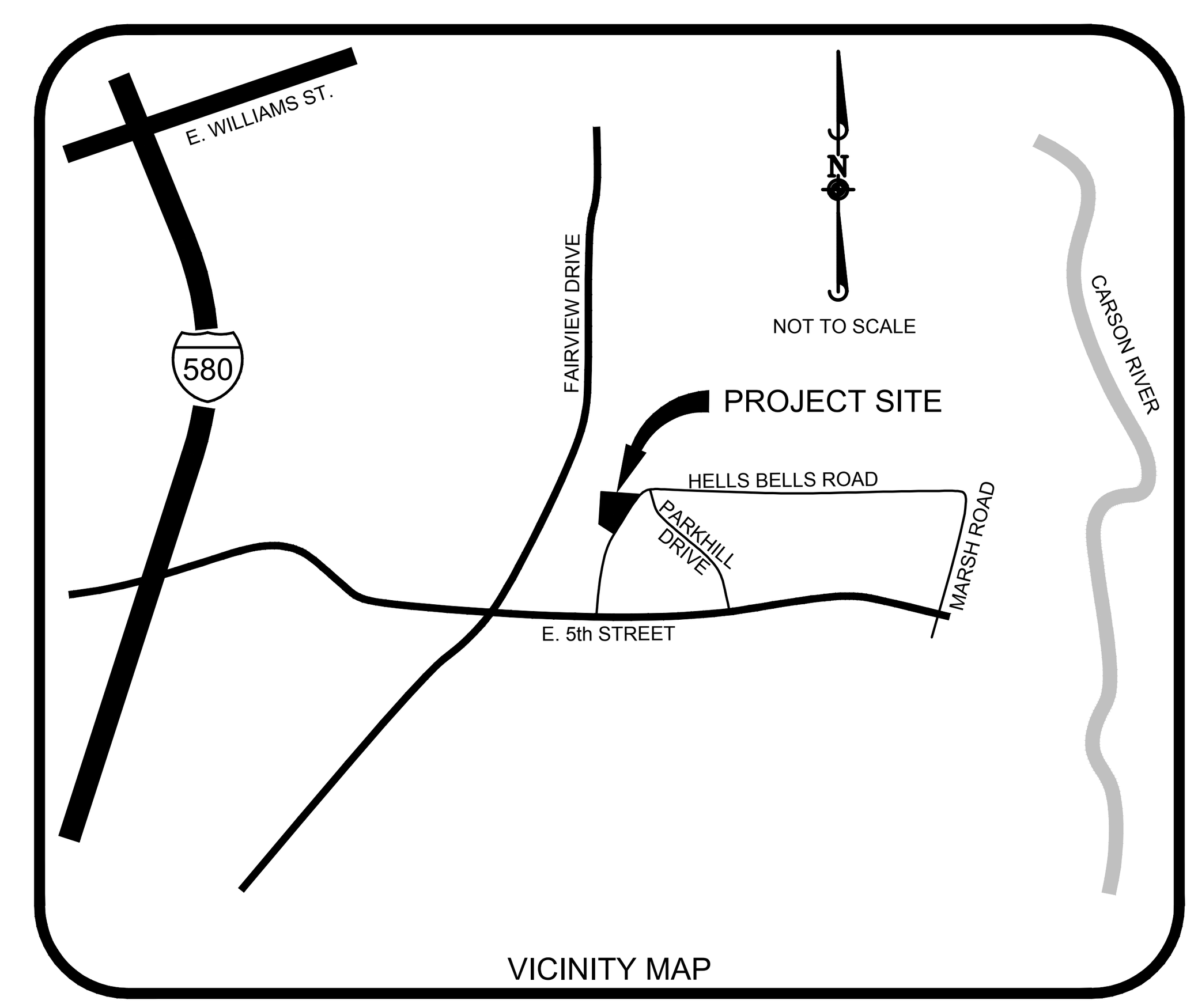
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGAL DESCRIPTION

NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 15, TOWNSHIP 15 NORTH, RANGE 20 EAST, MOUNT DIABLO MERIDIAN AND BASELINE



TYPICAL LOT SETBACKS



VICINITY MAP

Manhard CONSULTING LTD
Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

RIVERVIEW TERRACE
CARSON CITY, NEVADA
TENTATIVE MAP - GRADING / UTILITY / SITE PLAN

PROFESSIONAL ENGINEER - STATE OF NEVADA
KEVIN C. KOSSOL
Exp: 6/30/17
CIVIL
No. 11509

PROJ. MGR.:	KS
PROJ. ASSOC.:	
DRAWN BY:	KCK
DATE:	4/20/2017
SCALE:	1"=30'

SHEET
1

Manhard CONSULTING LTD

PRELIMINARY DRAINAGE STUDY REPORT

FOR

RIVERVIEW TERRACE

CARSON CITY, NEVADA

Prepared for:

Liberty Homes LLC
P.O. Box 1856
Gardnerville, NV 89410

Prepared by:

Manhard Consulting Ltd.
9850 Double R Boulevard
Suite 101
Reno, Nevada 89521

Project: LIBCCNV01

Date: 3/21/17

Table of Contents

Appendices

List of Figures

List of Tables

1 INTRODUCTION

1.1 Purpose of Analysis

This report presents the data, hydrologic and hydraulic analyses, and conclusions of a preliminary technical drainage study performed for Riverview Terrace to support the proposed development in Carson City, Nevada. In addition, in the interest of brevity and clarity, this report will defer to figures, tables, and the data and calculations contained in the appendices, whenever possible.

1.2 Project Location and Description

The Riverview Terrace development is approximately 3.07+/- acres in size and located in the central-eastern portion of Carson City and is east of Fairview Drive and north of East 5th Street. This site is situated within the Northwest ¼ of the Southwest ¼ of Section 15, Township 15 North, and Range 20 East of the Mount Diablo Meridian (refer to Figure 1, Vicinity Map). The project site is within the existing parcels 010-361-05 and 010-361-06.

1.3 Project Description

The Riverview Terrace development is a proposed subdivision which consists of 5 single-family residential homes on a 3.07+/- acre parcel. The project site is currently zoned SF21.

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community-Panel Number 3200010111G, effective date December 22, 2016, the subject property is located in Zone X (area of minimal flood hazard, outside the Special Flood Hazard Area and higher than the elevation of the 0.2-percent-annual-chance flood) and Shaded Zone X (0.2% annual chance flood hazard, areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile). (Appendix A).

The purpose of this report is to analyze the existing and proposed conditions of the subject property based on the 5-year and 100-year peak flow events. The report contains the following sections: (1) Methodologies and Assumptions, (2) Existing Hydrology, (3) Proposed Hydrology, and (4) Conclusion.

2 METHODOLOGIES AND ASSUMPTIONS

2.1 Hydrologic Modeling Methods

Hydrologic analyses were performed to determine the peak discharge for the 5-year and 100-year peak flow events. The *Rational Method* analysis to model the hydrologic basins that contribute in the existing and proposed conditions.

Parameters for peak storm flow and runoff volume estimates presented herein were determined using the data and methodologies presented in the *Carson City Municipal Code, Division 14 – Storm Drainage* section. In instances where the Carson City Municipal Code, Division 14 (CCMC-14) was lacking information or specificity, the *Truckee Meadows Regional Drainage Design Manual (2009)* and/or the other appropriate sources and software user manuals were referenced.

For the existing and proposed on-site hydrologic conditions, the Rational Method was utilized in accordance with the CCMC-14. A minimum time of concentration of 10-minutes was used for all sub-basins for a conservative analysis.

The rainfall characteristics were modeled using the NOAA database (http://dipper.nws.noaa.gov/hdsc/pfds/sa/nv_pfds.html) to determine site specific depth of precipitation (Appendix A).

Rational Formula: **Q=CiA**
Q=Peak Discharge (cfs)
C=Runoff Coefficient (dimensionless)
i=Precipitation Intensity (in/hr)
A=Watershed Area (Acres)

3 EXISTING HYDROLOGIC CONDITIONS

3.1 Existing On-Site Drainage

For the existing catchment, a time of concentration (Tc) of 10 minutes and the Rational Method coefficients were selected, taking into consideration the catchment characteristics, which include catchment area and land cover. A 5-year intensity of 1.43 in/hr and 100-year intensity of 3.49 in/hr were used. Table 1 and Figure 2 summarize the characteristics of on-site catchment of the study area. Reference Figure 2 (Existing Hydrologic Conditions) for existing hydrology drainage map and the associated hydrologic sub-areas.

Table 1 – Existing Conditions Rational Method Model Summary for the Riverview Terrace, Carson City, Nevada.

Sub-Basin	Area (Ac.)	Rational Method Coefficient (C_5/C_{100})	Time of Concentration (min)	Rainfall Intensity (I_5/I_{100}) (in/hr)	5-Year Peak Flows (cfs)	100-Year Peak Flows (cfs)
EX1	1.48	0.20/0.50	10.00	1.43/3.49	0.42	2.58
EX2	2.24	0.20/0.50	10.00	1.43/3.49	0.64	3.91
TOTAL	**3.72**	**-----**	**-----**	**-----**	**1.06**	**6.49**

The combined 5-year and 100-year peak flows from on-site catchment in the existing condition are 1.06 cfs and 6.49 cfs, respectively. The existing flows from area EX-1 discharge in a northerly direction toward the regional drainage system. The existing flows from area EX-2 discharges to the curb and gutter network in Hells Bells Road and flows in a northern direction on to the regional drainage system and on to the Carson River.

4 PROPOSED HYDROLOGIC CONDITIONS

4.1 Proposed On-Site Drainage

For the proposed basin, a time of concentration (Tc) of 10 minutes and the Rational Method coefficients were selected, taking into consideration the catchment characteristics, which include catchment area and land cover. The sub-areas took into account the proposed on-site flows that affect the site. The associated calculated 5-year and 100-year peak flows can be found in Table 2. A 5-year intensity of 1.43 in/hr and 100-year intensity of 3.49 in/hr were used. Discharge from the highest elevations will flow into rear lot swales and push flows in a northerly direction toward the regional drainage system. Drainage for the developed site will be contained in property swales and end up in the curb and gutter network of Hells Bells Road flowing to the same outlet area as the existing conditions (northerly direction on to the regional drainage system and on to the Carson River).

Table 2 – Proposed Conditions Rational Method Model Summary for the Riverview Terrace Project, Carson City, Nevada.

Sub-Basin	Area (Ac.)	Rational Method Coefficient (C_5/C_{100})	Time of Concentration (min)	Rainfall Intensity (I_5/I_{100}) (in/hr)	5-Year Peak Flows (cfs)	100-Year Peak Flows (cfs)
P-1	2.10	0.40/0.55	10.00	1.43/3.49	1.20	4.03
P-2	1.62	0.40/0.55	10.00	1.43/3.49	0.93	3.11
TOTAL	**3.72**	**-----**	**-----**	**-----**	**2.13**	**7.14**

5 HYDRAULIC ANALYSIS

5.1 Proposed Drainage Conditions

The combined 5-year and 100-year peak flows from on-site catchment in the proposed condition are 2.13 cfs and 7.14 cfs, respectively. Area P-1 drainage will be conveyed via a rear lot swale and discharge in a northerly direction discharge in the direction of the regional drainage system. Area P-2 discharge will be conveyed via onsite lot drainage swales to the curb and gutter network in Hells Bells Road. All flows end up intercepting with flows from area P-1 ending up in the regional drainage system and on to the Carson River.

5.2 Storm Drain Network/Retention/Detention

According to the existing and proposed hydrologic analysis, the existing 5-year and 100-year condition flows are 1.06 cfs and 6.49 cfs, respectively, and the proposed 5-year and 100-year condition flows are 2.13 cfs and 7.14 cfs. This is a 5-year increase of 1.07 cfs and a 100-year increase of 0.65 cfs. Given the minimal increase in both the 5-year and 100-year storm conditions and adjacency to regional drainage facilities, storm drain and retention/detention were not considered. The existing drainage mitigation conditions prove to be suffice for this application.

6 CONCLUSION

6.1 Regulations and Master Plans

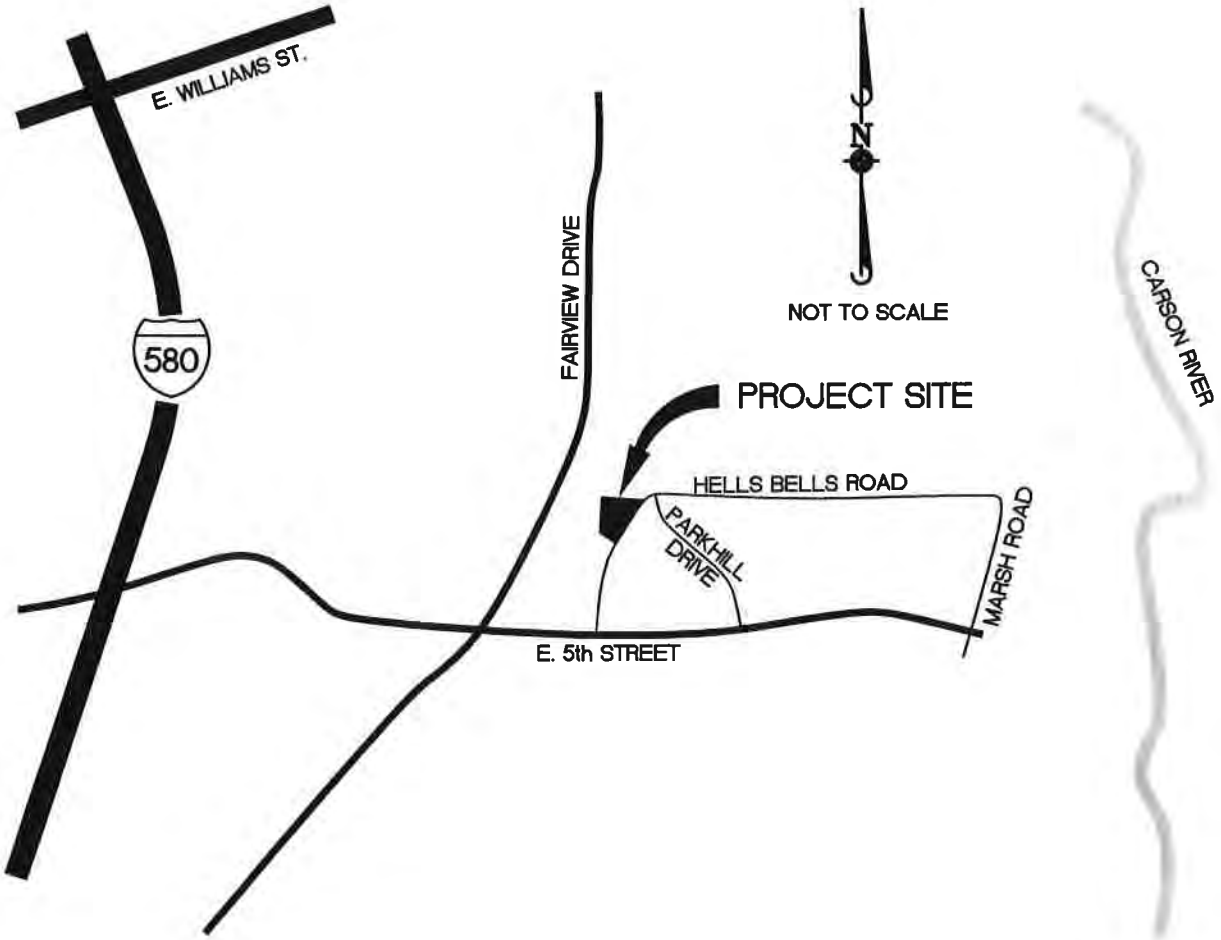
The proposed improvements and the analyses presented herein are in accordance with drainage regulations presented in *Carson City Municipal Code, Division 14 – Storm Drainage* section. In instances where the Carson City Municipal Code, Division 14 (CCMC-14) was lacking information or specificity, the *Truckee Meadows Regional Drainage Design Manual (2009)* and/or the other appropriate sources and software user manuals were referenced.

6.2 Impacts to Adjacent Properties

The performance of the proposed project improvements, roadways, and storm water conveyance facilities, once constructed, will not adversely impact upstream or downstream properties adjacent to this site.

6.3 Standards of Practice

This study was prepared using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable professional engineers practicing in this and similar localities.



VICINITY MAP

N.T.S.

Manhard CONSULTING LTD
9850 Double R Blvd, Suite 101 Reno NV 89521 tel (775) 746-3500 fax (775) 746-3520 www.manhard.com
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Construction Managers · Environmental Scientists · Landscape Architects · Planners

RIVERVIEW TERRACE
CARSON CITY, NEVADA
VICINITY MAP

PROJ. MGR:	KK
DRAWN BY:	HED
DATE:	3/20/17
SCALE:	NTS

EXHIBIT 1
LIBCCNV01

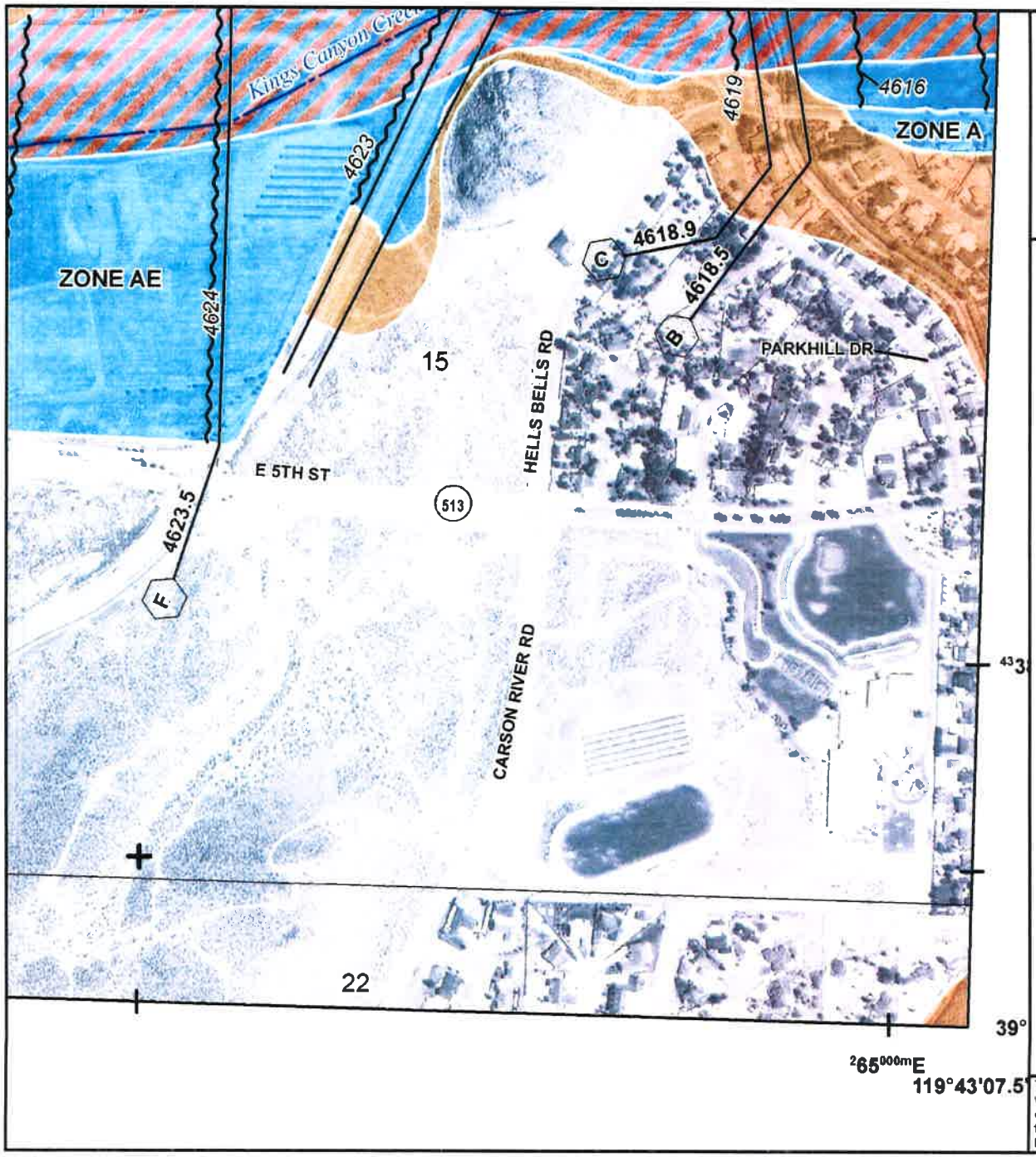
APPENDIX A
SUPPORTING DATA

RATIONAL FORMULA METHOD
RUNOFF COEFFICIENTS

Land Use or Surface Characteristics	Aver. % Impervious Area	Runoff Coefficients 5-Year (C_5)	Runoff Coefficients 100-Year (C_{100})
Business/Commercial:			
Downtown Areas	85	.82	.85
Neighborhood Areas	70	.65	.80
Residential:			
(Average Lot Size)			
⅛ Acre or Less (Multi-Unit)	65	.60	.78
¼ Acre	38	.50	.65
⅓ Acre	30	.45	.60
½ Acre	25	.40	.55
1 Acre	20	.35	.50
Industrial:	72	.68	.82
Open Space:			
(Lawns, Parks, Golf Courses)	5	.05	.30
Undeveloped Areas:			
Range	0	.20	.50
Forest	0	.05	.30
Streets/Roads:			
Paved	100	.88	.93
Gravel	20	.25	.50
Drives/Walks:	95	.87	.90
Roof:	90	.85	.87

Notes:

1. Composite runoff coefficients shown for Residential, Industrial, and Business/Commercial Areas assume irrigated grass landscaping for all pervious areas. For development with landscaping other than irrigated grass, the designer must develop project specific composite runoff coefficients from the surface characteristics presented in this table.



Universal Transverse Mercator Zone 11N; North Am
Western Hemisphere; Vertical Datum: NAVD 88

N

1 inch = 500 feet

0 250 500 750 1,000

FEMA

National Flood Insurance Program

NATIONAL FLOOD IN
FLOOD INSURAN

CARSON CITY, NEVA
Independent City

PANEL 111 OF 275

Panel Contains
COMMUNITY
CARSON CITY

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NOAA Atlas 14, Volume 1, Version 5
Location name: Carson City, Nevada, USA*
Latitude: 39.1637°, Longitude: -119.7233°
Elevation: 4646.1 ft**
* source: ESRI Maps
** source USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.13 (0.972-1.33)	1.40 (1.21-1.67)	1.87 (1.61-2.23)	2.33 (1.98-2.77)	3.08 (2.53-3.66)	3.77 (3.00-4.50)	4.58 (3.53-5.53)	5.56 (4.12-6.83)	7.10 (4.96-8.90)	8.50 (5.65-10.8)
10-min	0.858 (0.738-1.01)	1.07 (0.924-1.27)	1.43 (1.22-1.70)	1.78 (1.51-2.11)	2.35 (1.93-2.79)	2.86 (2.29-3.43)	3.49 (2.69-4.21)	4.23 (3.13-5.20)	5.41 (3.77-6.78)	6.46 (4.30-8.25)
15-min	0.708 (0.612-0.840)	0.884 (0.764-1.05)	1.18 (1.01-1.40)	1.46 (1.24-1.74)	1.94 (1.59-2.30)	2.37 (1.89-2.83)	2.88 (2.22-3.48)	3.50 (2.59-4.29)	4.47 (3.12-5.60)	5.34 (3.56-6.82)
30-min	0.476 (0.410-0.564)	0.594 (0.514-0.706)	0.794 (0.680-0.946)	0.988 (0.840-1.17)	1.30 (1.07-1.55)	1.59 (1.27-1.91)	1.94 (1.50-2.34)	2.35 (1.74-2.89)	3.01 (2.10-3.77)	3.60 (2.40-4.59)
60-min	0.295 (0.254-0.349)	0.368 (0.318-0.437)	0.492 (0.421-0.586)	0.611 (0.519-0.727)	0.807 (0.664-0.960)	0.986 (0.787-1.18)	1.20 (0.926-1.45)	1.46 (1.08-1.79)	1.86 (1.30-2.34)	2.23 (1.48-2.84)
2-hr	0.201 (0.179-0.231)	0.250 (0.221-0.286)	0.318 (0.280-0.364)	0.380 (0.331-0.434)	0.472 (0.401-0.542)	0.555 (0.460-0.644)	0.648 (0.524-0.761)	0.762 (0.594-0.906)	0.955 (0.713-1.18)	1.13 (0.818-1.44)
3-hr	0.160 (0.143-0.180)	0.199 (0.179-0.225)	0.250 (0.223-0.282)	0.292 (0.258-0.329)	0.352 (0.306-0.398)	0.402 (0.344-0.460)	0.460 (0.384-0.531)	0.532 (0.436-0.624)	0.651 (0.516-0.793)	0.765 (0.590-0.965)
6-hr	0.110 (0.099-0.123)	0.138 (0.124-0.154)	0.171 (0.153-0.192)	0.198 (0.176-0.222)	0.234 (0.205-0.264)	0.263 (0.227-0.298)	0.292 (0.248-0.334)	0.325 (0.271-0.377)	0.374 (0.303-0.442)	0.418 (0.331-0.501)
12-hr	0.072 (0.064-0.081)	0.090 (0.080-0.102)	0.114 (0.101-0.128)	0.132 (0.117-0.149)	0.157 (0.137-0.178)	0.176 (0.152-0.201)	0.196 (0.166-0.225)	0.216 (0.179-0.251)	0.243 (0.197-0.289)	0.264 (0.210-0.319)
24-hr	0.047 (0.042-0.052)	0.059 (0.053-0.065)	0.074 (0.067-0.081)	0.086 (0.078-0.095)	0.103 (0.093-0.114)	0.116 (0.104-0.128)	0.130 (0.116-0.144)	0.145 (0.127-0.161)	0.164 (0.142-0.184)	0.180 (0.154-0.204)
2-day	0.028 (0.025-0.031)	0.035 (0.031-0.039)	0.044 (0.040-0.050)	0.052 (0.046-0.058)	0.062 (0.055-0.070)	0.071 (0.062-0.080)	0.079 (0.070-0.090)	0.088 (0.077-0.101)	0.101 (0.086-0.116)	0.111 (0.093-0.129)
3-day	0.020 (0.018-0.023)	0.026 (0.023-0.029)	0.033 (0.029-0.037)	0.038 (0.034-0.043)	0.046 (0.041-0.052)	0.053 (0.046-0.060)	0.059 (0.052-0.067)	0.066 (0.057-0.076)	0.076 (0.065-0.088)	0.084 (0.070-0.098)
4-day	0.017 (0.015-0.019)	0.021 (0.019-0.024)	0.027 (0.024-0.030)	0.032 (0.028-0.036)	0.038 (0.034-0.043)	0.044 (0.038-0.050)	0.049 (0.043-0.056)	0.056 (0.048-0.063)	0.064 (0.054-0.074)	0.071 (0.059-0.083)
7-day	0.011 (0.010-0.012)	0.014 (0.012-0.016)	0.018 (0.016-0.020)	0.021 (0.019-0.024)	0.025 (0.023-0.029)	0.029 (0.025-0.033)	0.033 (0.028-0.037)	0.037 (0.032-0.042)	0.042 (0.036-0.048)	0.046 (0.039-0.054)
10-day	0.008 (0.008-0.009)	0.011 (0.010-0.012)	0.014 (0.012-0.016)	0.016 (0.014-0.018)	0.020 (0.017-0.022)	0.022 (0.019-0.025)	0.025 (0.022-0.028)	0.028 (0.024-0.031)	0.031 (0.027-0.036)	0.034 (0.029-0.040)
20-day	0.005 (0.005-0.006)	0.006 (0.006-0.007)	0.008 (0.007-0.009)	0.010 (0.009-0.011)	0.012 (0.010-0.013)	0.013 (0.012-0.015)	0.014 (0.013-0.016)	0.016 (0.014-0.018)	0.018 (0.015-0.020)	0.019 (0.016-0.022)
30-day	0.004 (0.003-0.004)	0.005 (0.004-0.005)	0.006 (0.006-0.007)	0.007 (0.006-0.008)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.011 (0.009-0.012)	0.012 (0.010-0.013)	0.013 (0.011-0.015)	0.014 (0.012-0.016)
45-day	0.003 (0.003-0.003)	0.004 (0.003-0.004)	0.005 (0.004-0.005)	0.006 (0.005-0.006)	0.007 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.009 (0.008-0.011)	0.010 (0.009-0.011)
60-day	0.003 (0.002-0.003)	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.004-0.005)	0.006 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.008 (0.007-0.009)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS)

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values

Please refer to NOAA Atlas 14 document for more information.

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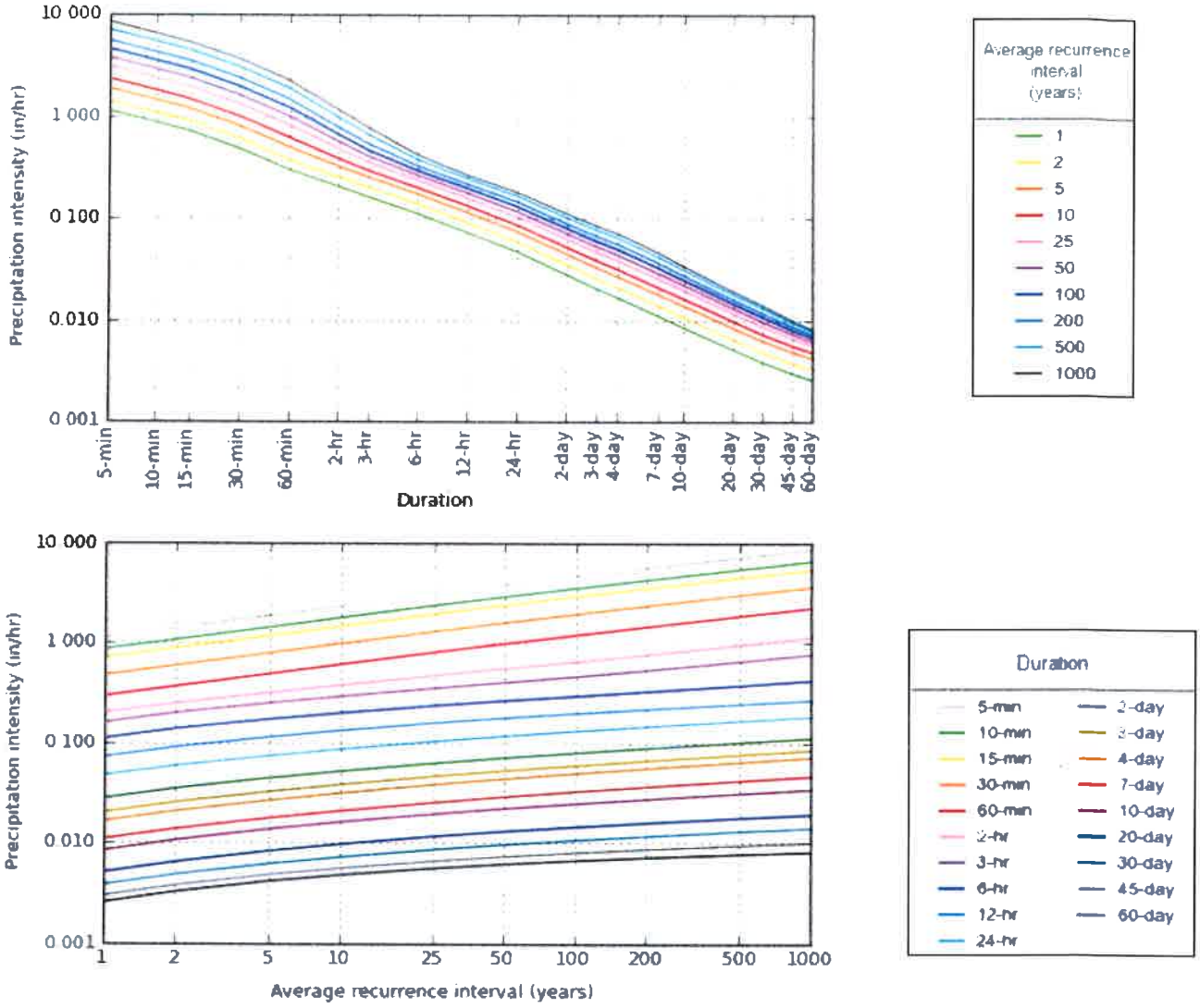
PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 39.1637°, Longitude: -119.7233°



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Mon Mar 20 18:00:56 2017

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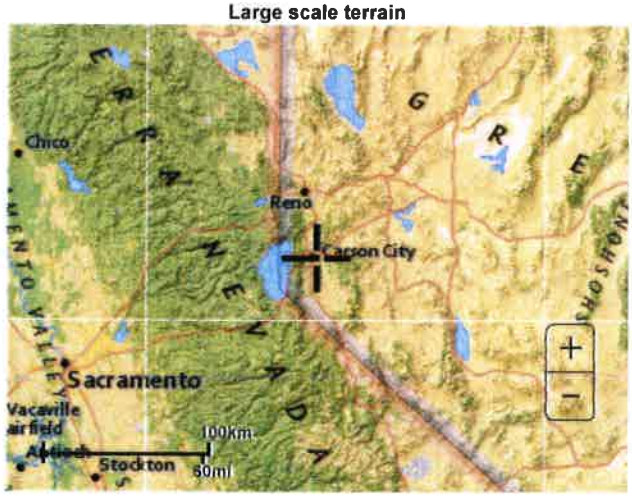
Maps & aerials

Small scale terrain

Large scale terrain



Large scale map

Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

AREA EX-1
A=1.48 ac
i(5)=1.43 in/hr
i(100)=3.49 in/hr
C(5)=0.20
C(100)=0.50
Q(5)= 0.42 cfs
Q(100)= 2.58 cfs

AREA EX-2
A=2.24 ac
i(5)=1.43 in/hr
i(100)=3.49 in/hr
C(5)=0.20
C(100)=0.50
Q(5)=0.64 cfs
Q(100)=3.91 cfs

APN 010-032-08
STATE OF NEVADA

APN 010-361-06
LEE FAMILY TRUST

APN 010-361-05
LEE FAMILY TRUST

APN 010-032-34
STATE OF NEVADA

APN 010-361-07
GARRIDO

APN 010-032-31
CARSON CITY

ZONE X

ZONE X
(SHADED)

ZONE AE

REGULATORY
FLOODWAY

LOT #3
31,593 S.F.
FG=40.70

HELLS BELLS ROAD
(EXIST/PUBLIC)

PARKHILL DR.
(EXIST/PUBLIC)

3:1

4700 4710 4690 4680 4670 4660 4650 4640 4630 4620

0 15 30 60 90

1"=30'

DATE	REVISION	DRAWN BY	CHECK BY

Manhard CONSULTING LTD

3479 Executive Pointe Way, Suite 12, Carson City, NV 89706 ph:775.883.7900 fx:775.883.8630 manhard.com
Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

RIVERVIEW TERRACE

CARSON CITY, NEVADA

EXISTING HYDROLOGIC CONDITIONS DISPLAY

PROJ. MGR.:	KK
PROJ. ASSOC.:	
DRAWN BY:	HED
DATE:	3/21/2017
SCALE:	1"=30'

SHEET
2

March 21, 2017 - 10:08 Dwg Name: P:\Active\01\dwg\StormWater\Exhibits\Existing Hydro Exhibit.dwg Updated By: eddavson

0 15 30 60 90

1"=30'

AREA P-1
A=2.10 ac
i(5)=1.43 in/hr
i(100)=3.49 in/hr
C(5)=0.40
C(100)=0.55
Q(5)=1.20 cfs
Q(100)=4.03 cfs

AREA P-2
A=1.62 ac
i(5)=1.43 in/hr
i(100)=3.49 in/hr
C(5)=0.40
C(100)=0.55
Q(5)=0.93 cfs
Q(100)=3.11 cfs

APN 010-032-08
STATE OF NEVADA

APN 010-361-06
LEE FAMILY TRUST

APN 010-361-05
LEE FAMILY TRUST

APN 010-032-34
STATE OF NEVADA

APN 010-032-31
CARSON CITY

FEMA DESIGNATOR LINE

PROPERTY LINE

EXISTING PARCEL LINE

SLOPE CUT-OFF DITCH

ZONE X

ZONE X (SHADED)

ZONE AE

REGULATORY FLOODWAY

RETAINING WALL (7' MAX HEIGHT)

RETAINING WALL (8' MAX HEIGHT)

RETAINING WALL (5' MAX HEIGHT)

TW=25.80
FG=18.80

TW=58.00
FG=50.00

TW=40.00
FG=35.00

LOT #1
21,278 S.F.
FG=50.00

LOT #2
26,476 S.F.
FG=46.90

LOT #3
31,593 S.F.
FG=40.70

LOT #4
32,919 S.F.
FG=35.50

LOT #5
21,640 S.F.
FG=28.70

49.50 HP
48.00 GB
48.60 FG

46.40 HP
44.90 GB
45.40 FG

40.20 HP
38.70 GB
39.20 FG

35.00 HP
33.50 GB
34.00 FG

28.20 HP
26.70 GB
27.20 FG

Δ=03°28'46"
R=1470.00
L=89.27

L=5.78

N 29°54'33" E 255.66

N 29°54'33" E 445.74

HELLS BELLS ROAD
(EXIST/PUBLIC)

PARKHILL DR
(EXIST/PUBLIC)

EXISTING CURB AND GUTTER

60' R/W

Manhard CONSULTING LTD
3476 Executive Pointe Way, Suite 12, Carson City, NV 89706 ph:775.883.7863 fx:775.883.7892 manhard.com
Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

DATE	REVISION	DRAWN BY	CHECK BY

RIVERVIEW TERRACE

CARSON CITY, NEVADA

PROPOSED HYDROLOGIC CONDITIONS DISPLAY

PROJ. MGR.:	KK
PROJ. ASSOC.:	
DRAWN BY:	HED
DATE:	3/21/2017
SCALE:	1"=30'

SHEET
3

March 21, 2017 - 10:09 Dwg Name: P:\Litecnv01\Data\Storm\Water\Exhibits\Proposed Hydro Exhibit.dwg Updated By: eclawson

Resource Concepts Inc

April 28, 2017

Mr. Christian Funk
Liberty Homes, LLC.
PO Box 2388
Gardnerville, NV 89410

Subject: ***GEOTECHNICAL INVESTIGATION for RIVERVIEW SUBDIVISION HELLS BELLS ROAD CARSON CITY, NEVADA***

Dear Mr. Funk:

In accordance with your request, we are submitting our Geotechnical Investigation for the Riverview Subdivision, Carson City, Nevada. Our work is intended for the sole and exclusive use of Liberty Homes, LLC., their agents, or designated representatives.

Four geotechnical concerns have been identified on the site that will impact the construction process. The constraints are highly compressible soils (clayey silt), moderate to steep slopes, undocumented fill and a potentially active fault running north to south on the westerly side of both parcels. However, these constraints should not prohibit or limit development on the site when properly mitigated and planned for. Specific mitigations and material handling recommendations are provided herein.

We appreciate the opportunity to work with you on this project. Should you have questions concerning the contents of this report, or if we may be of further service, please contact the undersigned at your convenience.

Sincerely,
RESOURCE CONCEPTS, INC.

PROFESSIONAL ENGINEER - STATE OF NEVADA
GARY C. LUCE
Exp. 12-31-17
CIVIL
No. 12001
4/28/2017

Gary Luce, P.E.
Senior Geotechnical Engineer

Dave Edgington, EI
Geotechnical Engineering Intern

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LIST OF APPENDICES

PRELIMINARY GEOTECHNICAL INVESTIGATION

1.0 INTRODUCTION

This report presents the results of our preliminary geotechnical investigation for the Riverview Terrace Subdivision (the "Site") located in Carson City, Nevada as shown on Figure 1, the Vicinity Map. The site is currently identified by the Carson City Assessor by Assessor Parcel Numbers (APN's) 10-361-05 and 10-361-06. The site consists of two lots totaling approximately 3.37-acres located on Hells Bells Road. The lots will be divided into five separate parcels as part of the development permitting process. It is our understanding that the proposed development will consist of residential construction, retaining walls and associated landscaping. It is assumed that the proposed residential structures will be one or two-story raised floor structures supported by conventional spread footings.

The primary focus of the investigation was to evaluate the general subsurface geologic and soil conditions for the area of the site. Based on the site characterization, recommendations for grading, foundation design and related geotechnical concerns are provided. This report is considered preliminary until site grading, and structural plans are available for review.

2.0 SCOPE OF SERVICES

The scope of service performed to prepare this report included discussion of the project with the client and reviewing the following documents:

- *Manhard Consulting Ltd., Conceptual Subdivision Map, Riverview Terrace, March 2017*
- *Bell, J.W. and Trexler, D.T., 1979, New Empire Quadrangle, Earthquake Hazards Map, Nevada Bureau of Mines and Geology, Scale 1: 24,000.*
- *Bingler, E.C., New Empire Geologic Map, Nevada Bureau of Mines and Geology, 1977, Scale 1: 24,000.*
- *Natural Resources Conservation Service Website, Soil Survey of Carson City Area, Nevada, (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).*
- *U.S. Geological Survey, Quaternary fault and fold database for the United States, accessed April, 2017 from USGS web site: http://earthquake.usgs.gov/regional/qfaults/.*
- *Review of published geologic maps, in-house documents, and other literature pertaining to the project area to aid in evaluating geologic conditions and hazards that may be present.*

In addition, we performed field, laboratory analyses and document preparation tasks:

- Observed the excavation of seven exploratory test pits (TP-1 through TP-7) at the site. The test pits were excavated using a Deere Backhoe 310J equipped with a 24-inch bucket to depths ranging from about ten feet below the existing ground surface (bgs). The approximate locations of the exploratory test pits are depicted on the Site Exploration Map, Figure 2.
- Observed aerial photographs of the site to evaluate the location of mapped faulting. Made a site visit to observe the rock outcrops and cut face just south of the project site for evidence of faulting.
- Logged the test pits in accordance with the Unified Soil Classification System (USCS).
- Obtained bulk samples from the test pits. Logs of the exploratory test pits and other details of the field investigation are included in Appendix A.

- Submitted selected soil samples for geotechnical laboratory testing. Details of the laboratory-testing program including test results are included in Appendix B.
- Prepared this report presenting our preliminary findings, conclusions and recommendations regarding the geotechnical aspects of constructing the proposed project.

The recommendations presented herein are based on the analyses of the data obtained from exploratory boring and test pits, laboratory tests, engineering analyses, and our experience with similar soil and geologic conditions.

3.0 SITE AND PROJECT DESCRIPTION

The Riverview Terrace Subdivision Project, as currently proposed, includes approximately 3.37 acres of undeveloped land. The site is located on Hells Bells Road, Carson City, Nevada. Existing residential developments are present to west and south of the site. Vegetation on the site range from areas of sage brush and other low shrubs. The easterly portion of the site has been disturbed by grading sometime in the past and recreational vehicle use that appears to be on-going. The grading included the placement of undocumented fill in the center of the east side of the site. Minor amounts of construction debris piles are also present. Typical debris consisted of brick, concrete, asphalt and occasional metal pieces.

Topography of the project site is moderately to steep sloping to the southeast and northeast. Slopes range from a few percent to thirty or more percent on the west side of the site where rock outcrops are present. Elevations in the proposed project site area range from approximately 4625 feet to 4700 feet. It assumed based on preliminary site plans that the project will have substantial cut and fill quantities. The preliminary plans for the project show cut slopes on the east side of the site with fill on the northeast building pad area.

The proposed development will consist of five separate residential buildings, retaining wall and associated landscaping. The locations of our test pit explorations are shown on the Site Exploration Map, Figure 2.

The scope of construction anticipated to be performed for this project consists of (but may not be limited to) the following:

- Removal of surficial domestic debris spoils scattered across the site.
- Mass grading of the site.
- Residential building construction with conventional spread footings.
- Utility installations.
- Installation of drainage, retaining walls and landscaping elements on the site.

4.0 FIELD EXPLORATION

Our field investigation was performed on April 12, 2017. At that time seven test pits were performed utilizing a Deere 310J backhoe with a 24” bucket. Representative bulk samples were taken from the surface at each test pit locations.

At the time of the investigation, a rock cut slope just south of the site was observed by out geologist to assess the presence of faulting.

RCI test pit locations are shown on Figure 2 and are presented in Appendix A.

5.0 LABORATORY TESTING

Laboratory tests were performed in accordance with the American Society for Testing and Materials (ASTM), or by other locally accepted test methods. The types of tests performed are listed below:

- Gradation Analysis ASTM C117, D422
- Moisture Content\Density ASTM D2216\D2937\D1188
- Atterberg Limits ASTM D4318

Test results and descriptions of tests performed are provided in Appendix B.

6.0 REGIONAL GEOLOGY

The geology of the site is referenced from *New Empire Geologic Map* (Figure 3). The Eagle Valley area in which Carson City is situated is a large fault bounded valley typical of the western edge of the Great Basin geomorphic province. The geologic map indicates the project site is predominantly underlain by Quaternary older alluvial plain deposits of Eagle Valley and Triassic to Jurassic meta-volcanic bedrock. The alluvial deposits are described by Bingler (1977) as "yellowish brown to gray, unbedded to poorly bedded, poorly to moderately sorted fine silty sand, sandy silt, granular muddy coarse sand, and minor sandy gravel." The alluvial deposits within the Eagle Valley basin are on the order of 2,000 feet deep near the center of the basin based on published geophysical data. The meta-volcanic bedrock consists of andesite breccia (angular silicified rock fragments) in the area of the site. The local geology in the area of the project is presented as Figure 3, the Geologic Map.

7.0 SOIL AND GROUNDWATER CONDITIONS

7.1 Subsurface Conditions

Natural Resources Conservation Service mapping of the site shows three different soil units to be present. The NRCS data pertains only to the top five feet of soil present. The dominant soil units (and map numbers) are Greenbrae Gravelly Sandy Loam (21), Indiano Gravelly Fine Sandy Loam (35) and Voltaire Silty Clay Loam (77). All of these soil units are classified as dominantly silty sand (SM). The soil map units found on the site illustrated on the Soils Map, Figure 5 for reference.

The surface soil conditions to a depth of five feet that were observed in our test pits were relatively consistent with the descriptions found on the Natural Resources Conservation Service (NRCS) website. On-site soils as observed in our test pits are generally alluvial silty sand (SM) with occasional clayey sand (SC).

An undocumented fill is present on the north westerly portion of the site where the site slopes down to the north. A single test pit (TP-4) was excavated into the edge of the fill. The soils encountered in the fill appeared to be fine grained clay (CL), clayey sand (SC) and silt soils (ML). These soils are not suitable for use in structural areas.

7.2 Groundwater

Groundwater was not encountered in any test pits during our field exploration on April 12, 2017. It is estimated that groundwater is greater than ten feet below the surface of the site. Variations in rainfall, snowmelt, temperature, and other factors can cause fluctuations in the level of groundwater. Precipitation this year is well above average at the time of this report. We recommend that the owner pot-hole the site to explore for perched water if the project begins during the runoff period of this year. Groundwater flow in the project site area is generally to the southeast towards the Carson River.

8.0 GEOLOGIC HAZARDS

8.1 Active Faulting

Carson City is located near active faults which are capable of producing significant ground motions due to seismic events. Figure 4, the Fault Map for the site vicinity shows the distribution of active faults in the area taken from the U.S. Geological Survey (USGS), 2008 Quaternary fault and fold database for the United States; http//earthquake.usgs.gov/regional/q. Faults considered active for the type of development planned are located one mile north west the site. Based on the USGS data and the New Empire Earthquake Hazards Map (Nevada Bureau of Mines and Geology, 1979), a potentially active fault striking north to north east has been mapped across the western portion of the site. During our field exploration, a fault scarp was observed crossing the westerly portion of the property and is consistent with the USGS, Quaternary fault and fold database location. The conceptual subdivision design by Manhard Consulting LTD. shows that the mapped fault trace is located well over one hundred feet away from any building locations and therefore, the risk of fault ground rupture affecting the proposed buildings is considered low.

Strong seismic shaking is considered likely during the life of the project. Ground shaking intensities for design considerations should be governed by seismic events occurring along the base of the Carson Range on the Kings Canyon fault zone. Faulting along the Carson Range has been evaluated by the Nevada Bureau of Mines and Geology to be capable of producing earthquake Richter Magnitudes on the order of 7.0 with peak ground accelerations as high as 2.0 g. These values are equivalent to Modified Mercalli Intensities of X or greater.

The seismic risk due to shaking at the site is not considered significantly greater than that of the surrounding developments and the Carson City area in general. We recommend that seismic design of the structures be performed in accordance with the latest version of the International Building Code (IBC). Site-specific IBC geotechnical seismic design parameters are presented in Section 9.6 of this report.

8.2 Liquefaction

Strong vibratory motions such as those generated by earthquakes may cause liquefaction of granular soils. Soils that are highly susceptible to liquefaction are loose, granular and saturated. Liquefaction of soils may cause surface distress, loss of bearing capacity, and settlement of structures. Liquefaction is generally accepted to be restricted to within 50 feet of the surface due to confining pressures.

Lateral spreading is a ground-failure phenomenon that can also occur in association with liquefaction, whereby lateral displacements occur at the ground surface. Conditions required for lateral spreading include gently sloping terrain, and in particular, where a “free-face” (such as a creek bank) is nearby. Based on our review of the site topography, density of site soils, depth to groundwater and lack of liquefiable layers, the potential for liquefaction and lateral spreading is considered low.

8.3 Landslides and Slope Stability

We do not consider the potential for land sliding to be a hazard to the site provided that the civil design and grading recommendations provided herein are strictly adhered to.

8.4 Expansive Soil

No highly expansive soils were identified on the site during our investigation. Clayey sand (SC) and Sandy Clay (CL) with a low to moderate expansive potential were encountered during our exploration at depths between one and eight feet on the northerly about one third of the site. The soils may be placed in common fill areas, landscaping areas or disposed of offsite. Due to the random nature of these offensive soils, we recommend monitoring of the grading on the northerly portion of the site.

Uncontrolled fill removal and placement should also be monitored. Additional pot-holing of the uncontrolled fill is recommended to determine if some of these materials are suitable or can be blended to create a suitable fill for structural areas.

8.5 Flooding

Review of the FIRM map 3200010111G issued on December 22, 2016 indicates that the site is not located in areas within the 1.0 percent annual chance of flooding.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 General- Soil Handling and Excavation Characteristics

Our conclusions are based on our investigation conducted in April of 2017, review of previous geotechnical reports for areas on and near the site and our local experience.

9.1.1 Based on the results of our investigation, the site is geotechnically well suited for the proposed commercial uses, provided the recommendations presented herein are implemented in the design and construction of the project.

9.1.2 Our field investigation indicates that soils to typical construction depths on the site are characterized by stratified layers of silty sands. Moist, medium dense to dense silty sand layers are present in the range of approximately two to 10 feet below the surface with thin clayey sand (SC) and sandy clay (CL) lenses present on the northerly portion of the site to the total depth explored.

9.1.3 Potential seismic hazards at the site will likely be associated with possible moderate to strong ground shaking from an event along the regional active faults. A potentially active fault striking north to north east lies on the western portion of the site well outside the building envelopes and the risk of fault rupture is considered low. Structures should be designed in accordance with 2012 IBC seismic requirements.

9.1.4 Soil Conservation Service data, laboratory analysis, and our local experience indicate that the soils are not aggressive for either Type II or Type IP concrete. However, the soils are very aggressive (corrosive) for uncoated steel. The project structural engineer should consider the use of coatings or other cathodic protection where uncoated steel may be in contact with native soils.

9.1.5 A preconstruction conference should be held at the site prior to the beginning of grading operations with the owner, contractor, civil engineer and geotechnical engineer in attendance. Soil handling and grading requirements can be discussed at that time.

9.1.6 Site preparation should begin with the removal of existing brush, organic matter, uncontrolled fill and debris spoils scattered throughout the site. Prior to the commencement of grading, all domestic debris and refuse should be removed from the site and disposed of as appropriate. The depth of removal should be such that material exposed in the cut areas or soils to be used as fill is relatively free of organic matter. It is estimated that grubbing depths will range from four to six inches in depth. Material generated during stripping is not suitable for use in structural areas but may be placed in landscaped or other non-structural areas if deemed suitable for the specific application.

9.1.7 All references to relative compaction and optimum moisture content in this report are based on the ASTM D1557-12 Test Procedure.

9.1.8 Earthwork operations should be observed and compacted fill tested by our representative.

9.1.9 In our opinion, grading and excavations as currently envisioned may be accomplished with light to moderate effort with conventional heavy-duty grading/excavation equipment. Excavations in native soils are not anticipated to generate significant quantities of oversized material (greater than six inches in dimension) that will require special handling or exporting from the site.

9.1.10 Excavated native granular soils, free of organic matter or debris, generated from cut operations, after clearing and grubbing is complete, are anticipated to be suitable for use as engineered fill.

9.1.11 Where structural fill material is required, it should meet the Standard Specifications for Public Works specifications (304.03). Structural fill is defined herein as all fill within two feet laterally outside of building perimeter foundations. In addition, all fill placed beneath pavement sections should also be considered structural. Import structural fill material where required should be certified within the past year for public works usage or sampled and approved by RCI prior to its transportation to the site.

9.1.12 During or immediately following wet weather, the near-surface soil may deflect or pump under heavy equipment loads. Yielding soil conditions can typically be stabilized using one of the methods listed below. However, soil conditions and mitigation methods should be reviewed and approved by RCI when encountered.

- **Option 1.** Deeply scarify (10 to 12 inches) allow to air dry to near optimum moisture content and re-compact.
- **Option 2**. Remove unstable (wet) soils to a firm base and allow the wet subgrade soil to dry to near optimum moisture content and re-compact. Replace the removed soils with drier soil meeting the structural fill specifications.

Other stabilization alternatives such as geosynthetic fabrics or grids, rock stabilization layers and soil chemical treatments may be appropriate depending on the situation. Consultation with us is crucial for expedient and appropriate mitigation.

9.2 Grading – Building Pads

The following discussion and recommendations are intended for mass grading of structural areas and finish grading for foundation, driveway areas, and flatwork. Due to the lack of a grading plan at the time of this report these recommendations are subject to review prior to plan submittal to Carson City.

9.2.1 Building pad areas or in soil areas to receive fill, should be scarified to a depth of 8 to 10 inches and granular soils compacted to at least 90% relative compaction near optimum moisture content. In areas to receive structural fill where clay layers are present, the soils should be scarified to a depth of 8 to 10 inches and compacted to from 85% to 90% relative compaction at from one percent under to three percent over optimum moisture content.

9.2.2 Structural fill should then be compacted in horizontal layers and brought to final subgrade elevations. Structural fill should be placed in level 8-inch loose lifts. Each lift should be moisture conditioned at or near optimum moisture content and then compacted to a minimum of 90% relative compaction.

9.2.3 The cut portion of cut-fill transition building pads or pavements should be undercut at least one foot vertically for five feet laterally into the cut face from the point of transition and replaced with properly compacted structural fill. Where cut and fill soil slopes are required they should be constructed at a maximum gradient of 2:1 (horizontal to vertical).

9.3 Grading – Underground Utilities

9.3.1 Temporary excavations, such as utility trench sidewalls excavated within undisturbed native soils or structural fill should remain near-vertical to depths of at least four feet. Some minor sloughing should be expected within some of the cleaner surficial sand lenses or during periods of high precipitation. Native granular soils within ten feet of the existing surface should be considered Soil Type C by OSHA Standards. Native clay soils should be considered OSHA Type B soils. If the contractor is uncertain about the soil designation the Engineer should be contacted or the more conservative approach utilized by treating the excavation in question as Soil Type C. It is the contractor's responsibility to provide sufficient and safe excavation support per OSHA Standards as well as protecting nearby utilities, structures, and other improvements, which may be damaged by earth movements.

9.3.2 Bedding and pipe zone backfill should extend from the bottom of the trench excavation to a minimum of 6 inches above the crown of the pipe. Pipe bedding material should consist of Class A backfill material as defined by the Standard Specifications for Public Works (Orange Book). Bedding and pipe zone material should be hand compacted in 6-inch maximum lifts.

9.3.3 Trench backfill above the pipe zone should meet Orange Book Class E backfill requirements at a minimum and be compacted to a minimum of 90% relative density in structural areas and a minimum of 85% in landscape areas.

9.3.4 Underground utility trenches within structural areas (building pads and streets) should be backfilled with properly compacted material. Granular material excavated from the trenches should be adequate for use as backfill provided it does not contain deleterious matter, vegetation or rock larger than six inches in maximum dimension. Trench backfill should be placed in loose lifts not exceeding eight inches. The lifts should be compacted to a minimum of 90% relative compaction at or near optimum moisture content. Native clay soils will not be suitable for backfill due to their high fines content and significant backfill importation should be planned for.

9.4 Grading – Flatwork Areas

9.4.1 Flatwork subgrade areas underlain by native soil materials should be scarified to a depth of 8 to 10 inches and moisture conditioned at or near optimum moisture content. The upper six inches of pavement subgrade soils should be compacted to a minimum of 90% relative compaction at or near optimum moisture content.

9.4.2 The subgrade soils for pedestrian and vehicular pavements should be finished to a compacted smooth unyielding surface. Aggregate base used to support pedestrian and vehicular pavements should be compacted to a minimum of 95% relative compaction

9.5 Preliminary Foundation Design Criteria

The following foundation information is intended to provide project design criteria. When final grading plans are prepared, they should be reviewed by the Geotechnical Engineer and recommendations amended if or as necessary.

9.5.1 Conventional foundations should consist of continuous perimeter strip footings and isolated interior spread footings. Minimum strip footing width should not be less than 12 inches; isolated spread footings should be at least 18 inches' square.

9.5.2 Perimeter footings should extend at least 24 inches below lowest adjacent exterior grade bearing on compacted native soils, bedrock or structural fill. Interior footings should extend at least 8 inches below lowest adjacent grade. These embedment recommendations are

crucial for frost protection, to develop bearing capacity, to inhibit surface water intrusion into crawl spaces and to provide lateral force resistance. Final surface grading should provide for positive drainage away from the structure per the 2012 IBC. Footing and foundation backfill should be compacted to at least 90% below paving, concrete slabs or flatwork. In landscaped areas only, compaction of the top foot of exterior foundation backfill may be reduced to a minimum relative density between 85% and 90%.

9.5.3 Adjacent utilities should not be constructed in the zone of influence parallel to footings. The zone of influence may be taken to be the area beneath the footing and within a 1:1 plane extending out and down from the bottom of the footing. Utility penetrations into the building envelope should be made perpendicular to the building stem wall if possible.

9.5.4 Shallow foundations proportioned as recommended above may be designed based on the following preliminary allowable bearing capacities:

TABLE 9.5.4
ALLOWABLE BEARING CAPACITY/LATERAL BEARING/COEFFICIENT OF FRICTION

Soil Type	On- Compacted Native Soil	On 12 -inches of Structural Fill
Sands (SM, SW, SP or combinations)	2,000 psf/300 psf/0.35	2,500 psf/300 psf/0.35

Note: Additional bearing capacity may be achieved based on greater width or depth of embedment of the footing. Contact the Engineer for analysis and recommendations for those specific cases.

9.5.5 Total and differential settlements of footings under the recommended allowable bearing capacities is estimated to be less than one inch and three-quarters inch respectively.

9.6 Seismic Design Criteria

The site is located near active faults capable of generating strong seismic shaking during the life of the project. The project area should be considered Site Class D or "Stiff Soil" as defined by the 2012 IBC. The following table summarizes site seismic design criteria obtained from the 2012/15 IBC though the USGS Seismic Design Maps website http://earthquake.usgs.gov/designmaps/us/application.php.

TABLE 9.6
IBC SEISMIC DESIGN PARAMETERS

Parameter	Factors	IBC Reference
Site Class	D	Table 20.3-1 (2010 ASCE-7)
Spectral Acceleration	S_s = 2.286 S_1= 0.788	Figure 1613.3.1(1) Figure 1613.3.1(2)
Seismic Coefficient, F_a	F_a = 1.0	Table 1613.3.3(1)
Seismic Coefficient, F_v	F_v = 1.5	Table 1613.3.3(2)
Adjusted Spectral Response S_{MS}, S_{MI}	S_{MS} = 2.286 S_{MI} = 1.182	Equation 16-37 Equation 16-38
Design Spectral Acceleration S_{DS}, S_{D1}	S_{DS} = 1.524 S_{D1} = 0.788	Equation 16-39 Equation 16-40

9.7 Retaining Walls

Allowable bearing capacities for retaining wall foundations may be assumed as indicated in Table 9.5.4 above. Earth pressures are dependent on the backfill and should be considered on a case by case basis. However, for preliminary planning of retaining walls less than eight feet tall and assuming structural fill backfill at least three feet behind the wall the values in Table 9.7 are recommended.

TABLE 9.7
PRELIMINARY EARTH PRESSURE VALUES FOR RETAINING WALLS

Passive Pressure	At Rest Pressure	Active Pressure
360 psf/f	65 psf/f	40 psf/f

Positive drainage is essential behind any earth retaining structure to prevent the backfill from becoming saturated. Saturated backfill can result in significant (a factor of 2 or more) increases in the lateral wall pressures above the previously recommended values. Positive drainage for retaining walls should consist of a vertical layer of permeable material positioned between the retaining wall and the soil backfill. The permeable material may be composed of a composite drainage fabric, or a natural permeable material, such as coarse sand or pea gravel at least 6 inches in thickness, with a synthetic, geotextile filter fabric between it and the soil backfill.

Final plans for retaining structures should be submitted to RCI for review to ensure that the generalized recommendations above are appropriate to the specific wall being designed.

9.8 Conventional Slab Foundation Design Criteria

9.8.1 Conventional concrete slab-on-grade floors are suitable for the building pads prepared as recommended in Section 9.5. A minimum 10-mil-thick vapor retarder meeting ASTM E1745-97 Class C requirements may be placed below the slab where interior moisture is considered undesirable. The vapor retarder may be covered by an optional 2-inch layer of medium sand as a cushion. To reduce the potential for punctures, a higher quality vapor retarder (15 mil, Class A or B) may be used. The vapor retarder, if used, should extend to the edges of the slab, and should be sealed at all seams and penetrations. Slabs should be underlain by a minimum of 4 inches of compacted (95% minimum relative density) aggregate base. Slab thickness and reinforcement should be determined by the structural engineer based on the anticipated loading.

9.8.2 If a significant amount of time has passed since building pad grading and the soil surface of the building pad has become dry, then it should be re-moistened prior to placing the moisture retarding system. The building pad should be moistened by soaking or sprinkling such that the upper 12 inches of soil is near optimum moisture, as determined by our representative at least 48 hours before concrete placement.

9.8.3 Some floor coverings, such as tile or linoleum, are sensitive to moisture that can be transmitted from and through the slab. Slab floors should be moist cured for a minimum of 7 days prior to placing any floor coverings. Floor coverings should be installed in accordance with the manufacturer's recommendations including any moisture transmissivity testing requirements.

9.8.4 Crack control spacing should be determined by the project structural engineer based on slab thickness and intended usage.

9.8.5 All exterior concrete should be air entrained with from 4.5% to 7.0% air content. The water cement ratio for all exterior concrete should be 0.45 or less. The use of mid-range plasticizer is recommended to facilitate the finishing process while maintaining the desired water cement ratio.

9.8.6 Exterior concrete should be placed and finished in accordance with American Concrete Institute (ACI) recommendations for concrete placed in areas subject to freeze-thaw environments.

9.8.7 Recommendations presented herein are intended to reduce the potential for cracking of slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still exhibit some cracking. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of concrete, the use of crack control joints and proper concrete placing and curing. Adherence to ACI and Portland Concrete Association (PCA) recommendations including those for low humidity and wind, if applicable, should be incorporated into project construction practices.

9.9 Conventional Raised Floor Foundation Criteria

9.9.1 The structures can be supported by conventional shallow foundations within the building pads prepared in accordance with the recommendations of this report.

9.9.2 Foundations should consist of continuous strip footings or isolated spread footings or combinations thereof. Minimum strip footing width should not be less than 12 inches; isolated spread footings should be at least 18 inches' square. Grade beams are recommended (but not required) in lieu of interior piers to reduce the potential for seismic distress to the structure.

9.9.3 For raised floor construction, perimeter footings should extend at least 24 inches below lowest adjacent exterior grade and at least 8 inches below lowest adjacent interior grade, bearing into undisturbed native or compacted structural fill. Interior footings should extend at least 8 inches below lowest adjacent grade. These embedment recommendations are critical for frost protection and to develop bearing capacity, lateral force resistance and to reduce the potential for water intrusion under the structures.

9.9.4 Final surface grading should provide for positive drainage away from the structure. Footing and foundation backfill should be compacted in eight-inch maximum loose lifts to at least 90%. This compaction requirement is critical to inhibit surface drainage intrusion into crawl spaces.

9.9.5 Adjacent utilities should not be constructed in the zone of influence of footings. The zone of influence may be taken to be the area beneath the footing and within a 2V:1H plane extending out and down from the bottom of the footing.

9.9.6 Shallow foundations proportioned as recommended above and supported on compacted structural fill or native soils may be designed for an allowable soil bearing pressure of 2,000 psf. This value may be increased by up to one-third when considering transient loading due to wind or seismic forces. Total and differential settlements are estimated to be less than one inch and three-quarters inch respectively.

9.9.7 The passive pressure used to resist lateral movement of the footings may be assumed to be equal to a fluid weighing 315 pounds per cubic foot (pcf). The coefficient of friction to resist sliding is 0.30 for concrete against structural fill or native granular soils. Combined passive resistance and friction may be utilized for design provided that the frictional resistance is

reduced by 50%. For raised floor construction, the upper 10 inches of exterior embedment should not be included in calculations for resistance to lateral loads.

9.9.8 Reinforcement for the foundations should be designed by the project structural engineer. However, we recommend as a minimum, footings be reinforced with #4 steel reinforcing bars, two placed near the top of the footing and two placed near the bottom.

9.9.9 A 10 mil thick vapor retarder should be placed in the crawl space to limit vapor transmission from the crawl space into the structure.

9.10 Site Drainage

9.10.1 Adequate drainage is crucial to reduce the potential for differential soil movement, erosion and subsurface seepage. The site should be graded and maintained such that surface drainage is directed away from structures and the top of slopes into swales or other controlled drainage devices.

9.10.2 Soil slopes constructed steeper than recommended in Section 9.2.3 or where subject to concentrated flows in excess of thee feet per second should be stabilized with riprap, slope netting or other mechanical methods as designed by the project Civil Engineer.

9.10.3 Temporary erosion control during construction should be as per the approved storm water pollution prevention plan (SWPPP).

9.10.4 Landscape irrigation should be kept at least three feet away from all building foundations. We recommended that drip irrigation be installed near foundations wherever feasible.

9.10.5 An interceptor ditch or drain should be constructed at the top or bottom of the cut slopes for roads or buildings.

9.10.6 Under no circumstances should water be allowed to pond adjacent to footings.

10.0 CLOSURE

10.1 Grading Plan Review

RCI should review the grading plans and details prior to final design submittal to determine whether additional analysis and/or recommendations are required.

10.2 Limitations and Uniformity of Conditions

The preliminary recommendations of this report pertain only to the site investigated and are based upon the assumption that soil and groundwater conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, RCI should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by RCI.

This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

It is particularly important that interior confinement of footings is provided. Failure to confine the interior side of footings may result in water intrusion into crawl spaces. RCI cannot assume any responsibility for water intrusion into crawl spaces and associated damage if the recommendations

for footing confinement, backfill compaction and drainage provided in Section 9.2 and Section 9.10. are not followed. We recommend that builders photograph final grading and that buyers be particularly warned about the consequences of disrupting proper exterior drainage.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

11.0 REFERENCES

1. *Manhard Consulting Ltd., Conceptual Subdivision Map, Riverview Terrace, March 2017*
2. *Bell, J.W. and Trexler, D.T., 1979, New Empire Quadrangle, Earthquake Hazards Map, Nevada Bureau of Mines and Geology, Scale 1: 24,000.*
3. *Bingler, E.C., New Empire Geologic Map, Nevada Bureau of Mines and Geology, 1977, Scale 1: 24,000.*
4. *FEMA Flood Map Service Center, accessed April, 2017: http://map1.msc.fema.gov*
5. *Natural Resources Conservation Service Website, accessed April, 2017: (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).*
6. *Standard Specifications for Public Works Construction, Regional Transportation Commission of Washoe County, Washoe County, City of Sparks, City of Reno, Carson City, City of Yerington, 2012*
7. *U.S. Geological Survey Earthquake Hazards Program, U. S. Seismic Design Map web site: http://earthquake.usgs.gov/designmaps/us/application.php?*
8. *U.S. Geological Survey, Quaternary fault and fold database for the United States, accessed April, 2017 from USGS web site: http://earthquake.usgs.gov/regional/qfaults/.*
9. *Review of published geologic maps, in-house documents, and other literature pertaining to the project area to aid in evaluating geologic conditions and hazards that may be present*

FIGURES

Map Reference: *Google Earth, accessed on April 2017*

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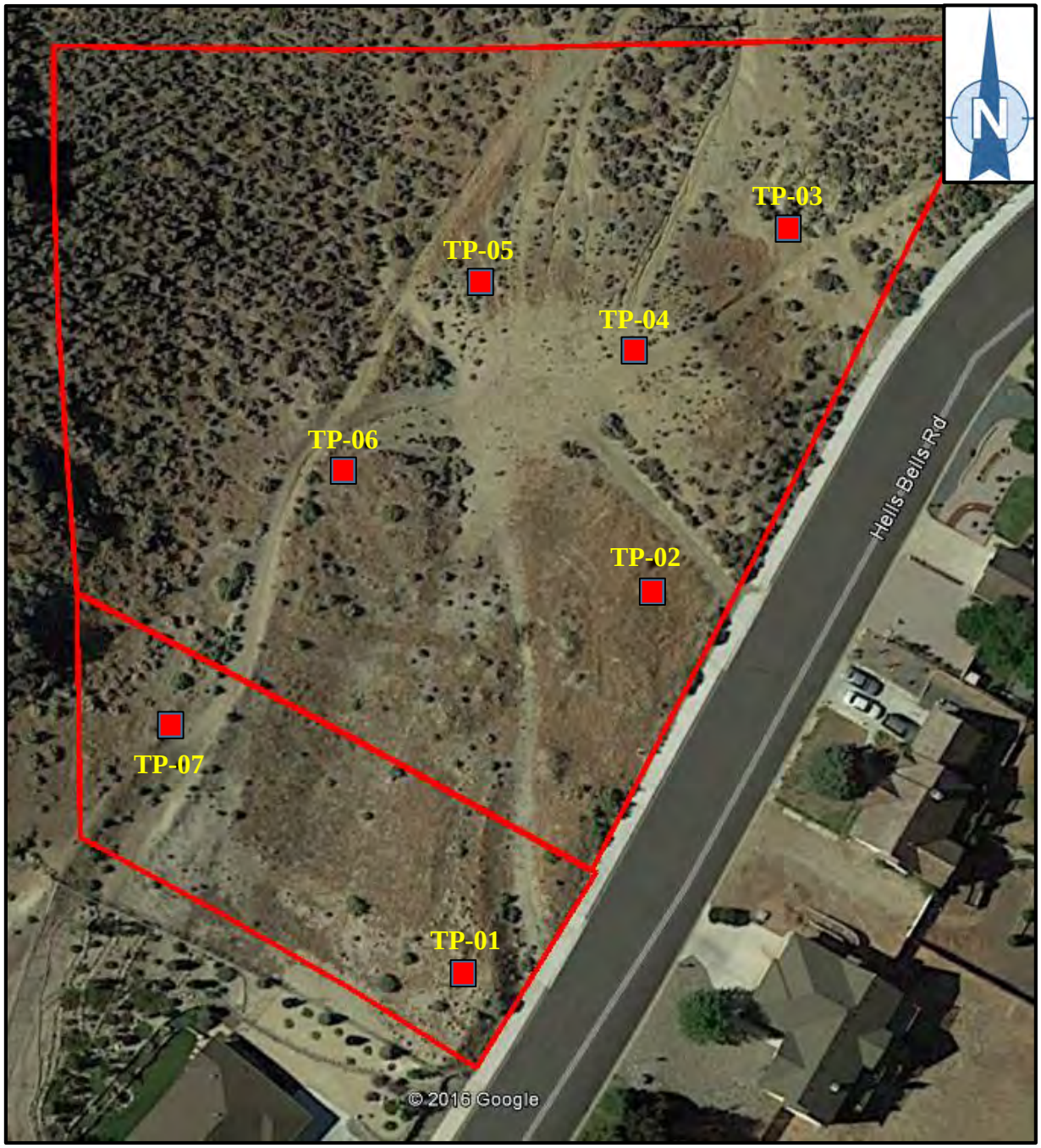
FIGURE 1 VICINITY MAP

RIVERVIEW TERRACE SUBDIVISION
CARSON CITY, NV

PROJECT NO. 17-103.1



Map Reference: *Google Earth, accessed on April 2017*

TEST PIT LOCATIONS OBSERVED BY RESOURCE CONCEPTS, INC. ON APRIL 12, 2017

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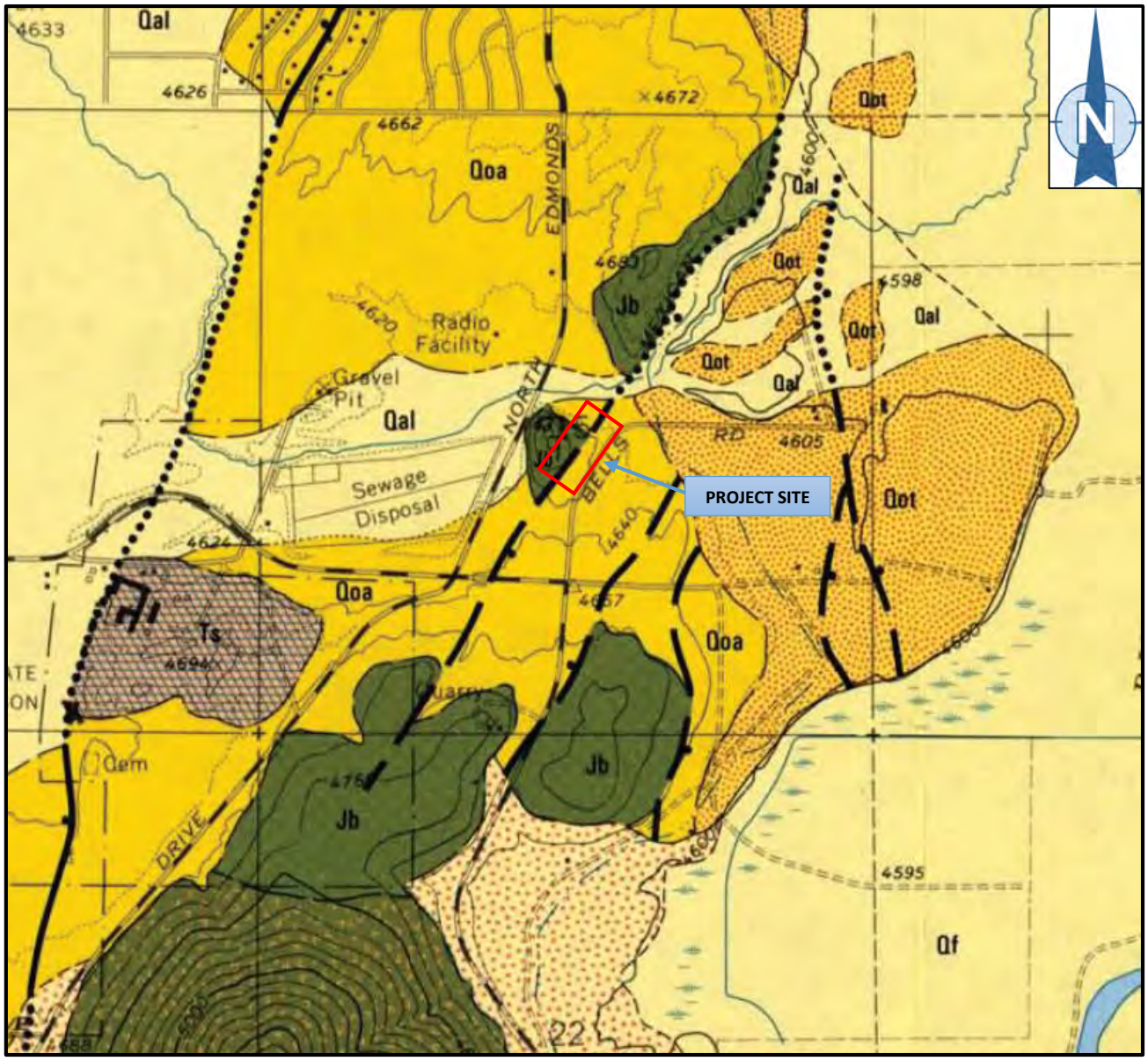
FIGURE 2 EXPLORATION MAP

RIVERVIEW TERRACE SUBDIVISION
CARSON CITY, NV

PROJECT NO. 17-103.1



E.C. Bingler, 1977

Qal- Alluvial-Plain Deposits
Qot- Terrace Deposits of the Carson River
Qoa- Old Alluvium
Jb- Metavolcanic Breccia
Ts- Sedimentary Rocks

——— FAULT
------- INFERRED FAULT LOCATION

Map Reference: *Nevada Bureau of Mines and Geology, 1977*
U.S. Geological Survey, New Empire 7 ½" quadrangle

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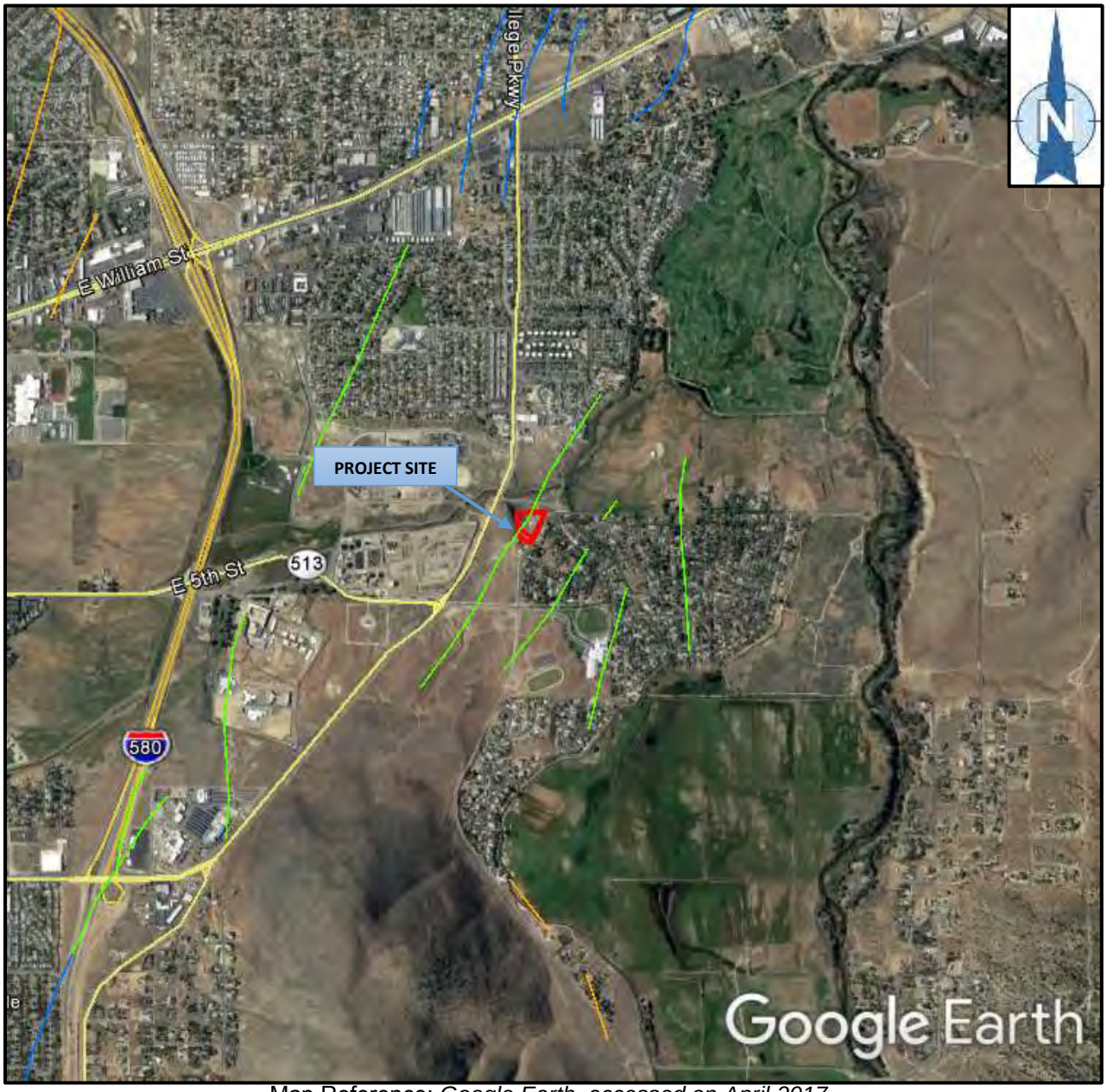
FIGURE 3 GEOLOGIC MAP

RIVERVIEW TERRACE SUBDIVISION
CARSON CITY, NV

PROJECT NO. 17-103.1



Map Reference: *Google Earth, accessed on April 2017*

Active Holocene Fault
Late Quaternary Fault (Inactive)
Quaternary Fault (Inactive)

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FIGURE 4 FAULT MAP

RIVERVIEW TERRACE SUBDIVISION CARSON CITY, NV

PROJECT NO. 17-103.1

Map Unit Symbol	Map Unit Name
21	**Greenbrae Gravelly Sandy Loam**
35	**Indiano Gravelly Fine Sandy Loam**
77	**Voltaire Silty Clay Loam**

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FIGURE 5 SOILS MAP

RIVERVIEW TERRACE SUBDIVISION CARSON CITY, NV

PROJECT NO. 17-103.1

APPENDIX A

FIELD INVESTIGATION

Our field exploration was performed on April 2017 and consisted of excavating 4 test pits. Test pits were completed using a backhoe with a 24" bucket. The soil conditions encountered in the test pits were visually examined, classified, and logged in general accordance with the Unified Soil Classification System. Upon completion of sampling and logging, the test pits were backfilled with native soil. Locations of the test pits are presented on the Site Exploration Map, Figure 2.

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TEST PIT NUMBER TP-01

CLIENT Liberty Homes
PROJECT NAME Riverview Terrace Subdivision
PROJECT NUMBER 17-103.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 4/12/17 **COMPLETED** 4/12/17
GROUND ELEVATION 4655 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR Liberty Homes
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION ---
LOGGED BY DTE **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0				SILTY SAND (SW-SM)- Brown, Moist, Loose to Medium Dense	
				2.3	4652.7
2.5				2.5 POORLY GRADED GRAVEL (GP)- Light Brown, Moist, Medium Dense	4652.5
				SILTY SAND (SM)- Brown, Moist, Medium Dense	
5.0				5.6	4649.4
		MC = 9% Fines = 9%		SILTY SAND (SM)- Light Reddish Brown, Moist, Medium Dense, Iron Oxidation Apparent	
7.5				8.8	4646.2
				SILTY SAND (SM)- Reddish Brown, Moist, Medium Dense to Dense, Iron Oxidation Apparent	
				9.7	4645.3
				Bottom of test pit at 9.7 feet.	

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TEST PIT NUMBER TP-02

CLIENT Liberty Homes
PROJECT NAME Riverview Terrace Subdivision
PROJECT NUMBER 17-103.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 4/12/17 **COMPLETED** 4/12/17
GROUND ELEVATION 4644 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR Liberty Homes
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION ---
LOGGED BY DTE **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0				SILTY SAND (SM) with Gravel- Brown, Moist, Loose to Medium Dense	
					4642.3
1.7				SILTY SAND (SM)- Brown, Moist, Medium Dense to Dense	
2.5					4641.6
2.4				SILTY SAND (SM)- Grayish Brown, Moist, Dense	
5.0					4638.8
5.2				SILTY SAND (SM)- Reddish Brown, Moist, Dense, Iron Oxidation Apparent	
7.5					4636.0
8.0				SILTY SAND (SM)- Grayish Brown, Moist, Medium Dense	
		MC = 9% Fines = 13%			
10.0					4634.0
10.0				Bottom of test pit at 10.0 feet.	

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TEST PIT NUMBER TP-03

CLIENT Liberty Homes
PROJECT NAME Riverview Terrace Subdivision
PROJECT NUMBER 17-103.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 4/12/17 **COMPLETED** 4/12/17
GROUND ELEVATION 4630 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR Liberty Homes
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION ---
LOGGED BY DTE **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0				SILTY SAND (SM) with Gravel- Brown, Moist, Loose to Medium Dense	
				0.7	4629.3
				CLAYEY SAND (SC)- Olive Brown, Moist, Dense	
				1.8	4628.2
2.5		MC = 21% Fines = 46%		CLAYEY SAND (SC)- Reddish Brown, Moist, Dense, Iron Oxidation Apparent	
				4.1	4625.9
5.0				SILTY SAND (SM) with Gravel- Grayish Brown, Moist, Medium Dense	
7.5				7.6	4622.4
				SILTY SAND (SM)- Olive Brown, Moist, Dense	
				9.0	4621.0

Bottom of test pit at 9.0 feet.

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TEST PIT NUMBER TP-04

CLIENT Liberty Homes
PROJECT NAME Riverview Terrace Subdivision
PROJECT NUMBER 17-103.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 4/12/17 **COMPLETED** 4/12/17
GROUND ELEVATION 4647 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR Liberty Homes
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION ---
LOGGED BY DTE **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0				UNCONTROLLED FILL- SILTY SAND (SM) with Gravel- Brown, Moist, Loose to Medium Dense	
				1.0	4646.0
				UNCONTROLLED FILL- SANDY SILT (ML)- Reddish Brown, Moist, Dense, Iron Oxidation Apparent	
2.5		MC = 62% LL = 96 PL = 67 Fines = 93%			
				3.6	4643.4
				UNCONTROLLED FILL- CLAYEY SAND (SC)- Reddish Gray, Moist, Dense, Iron Oxidation Apparent	
				4.6	4642.4
5.0				SILTY SAND (SM)- Grayish Brown, Moist, Medium Dense	
7.5					
				8.6	4638.4

Bottom of test pit at 8.6 feet.

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TEST PIT NUMBER TP-05

CLIENT Liberty Homes
PROJECT NAME Riverview Terrace Subdivision
PROJECT NUMBER 17-103.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 4/12/17 **COMPLETED** 4/12/17
GROUND ELEVATION 4648 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR Liberty Homes
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION ---
LOGGED BY DTE **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0				SILTY SAND (SM) with Gravel- Brown, Moist, Loose to Medium Dense	
				0.7	4647.3
				CLAYEY SAND (SC)- Brown, Moist, Dense	
				1.3	4646.7
				SILTY SAND (SM)- Reddish Brown, Moist, Medium Dense to Dense, Iron Oxidation Apparent	
2.5		MC = 24% LL = 34 PL = 24 Fines = 67%			
				3.8	4644.2
				SANDY CLAY (CL)- Brown, Moist, Dense	
				4.5	4643.5
5.0				SILTY SAND (SM)- Brown, Moist, Medium Dense	
7.5					
				8.9	4639.1
				Bottom of test pit at 8.9 feet.	

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TEST PIT NUMBER TP-06

CLIENT Liberty Homes
PROJECT NAME Riverview Terrace Subdivision
PROJECT NUMBER 17-103.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 4/12/17 **COMPLETED** 4/12/17
GROUND ELEVATION 4671 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR Liberty Homes
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION ---
LOGGED BY DTE **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0			SILTY SAND (SM) with Gravel- Brown, Moist, Loose to Medium Dense	
5.0				4666.0
			SILTY SAND (SM)- Grayish Brown, Moist, Medium Dense	
6.7				4664.3
			SILTY SAND (SM)- Light Brown, Moist, Medium Dense	
8.1				4662.9
			Bottom of test pit at 8.1 feet.	

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TEST PIT NUMBER TP-07

CLIENT Liberty Homes
PROJECT NAME Riverview Terrace Subdivision
PROJECT NUMBER 17-103.1
PROJECT LOCATION Carson City, Nevada
DATE STARTED 4/12/17 **COMPLETED** 4/12/17
GROUND ELEVATION 4686 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR Liberty Homes
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION ---
LOGGED BY DTE **CHECKED BY** GL
AT END OF EXCAVATION ---
NOTES
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0				SILTY SAND (SM) with Gravel- Brown, Moist, Medium Dense
2.5				
5.0		MC = 27% Fines = 41%		
6.8				4679.2

Bottom of test pit at 6.8 feet.

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures.

The remaining soil samples are stored in our laboratory for future reference and analysis if needed. Unless notified to the contrary, all samples will be disposed of 30 days from the date of this report.

GRAIN SIZE DISTRIBUTION

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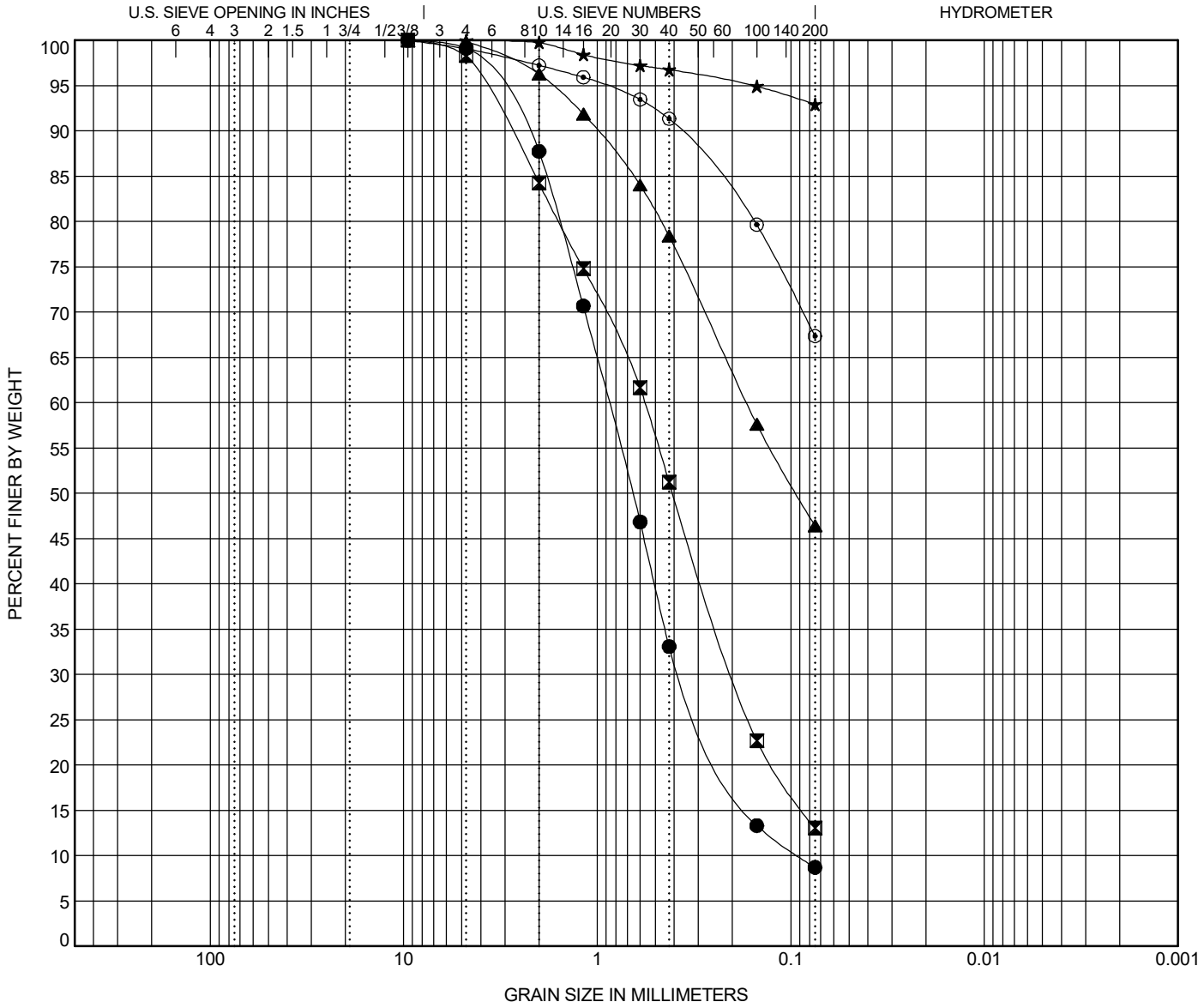
CLIENT Liberty Homes **PROJECT NAME** Riverview Terrace Subdivision

PROJECT NUMBER 17-103.1 **PROJECT LOCATION** Carson City, Nevada



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	TP-01	7.0	SILTY SAND (SW-SM)				1.64	9.58
⊠	TP-02	9.0	SILTY SAND (SM)					
▲	TP-03	3.0	CLAYEY SAND (SC)					
★	TP-04	2.0	UNCONTROLLED FILLL-SANDY SILT (ML)	96	67	29		
⊙	TP-05	4.0	SANDY CLAY (CL)	34	24	10		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP-01	7.0	9.5	0.871	0.361	0.091	0.8	90.5	8.7	
⊠	TP-02	9.0	9.5	0.568	0.196		1.7	85.3	13.0	
▲	TP-03	3.0	4.75	0.169				53.4	46.4	
★	TP-04	2.0	4.75				0.0	7.0	93.0	
⊙	TP-05	4.0	9.5				0.9	31.7	67.4	

GRAIN SIZE DISTRIBUTION

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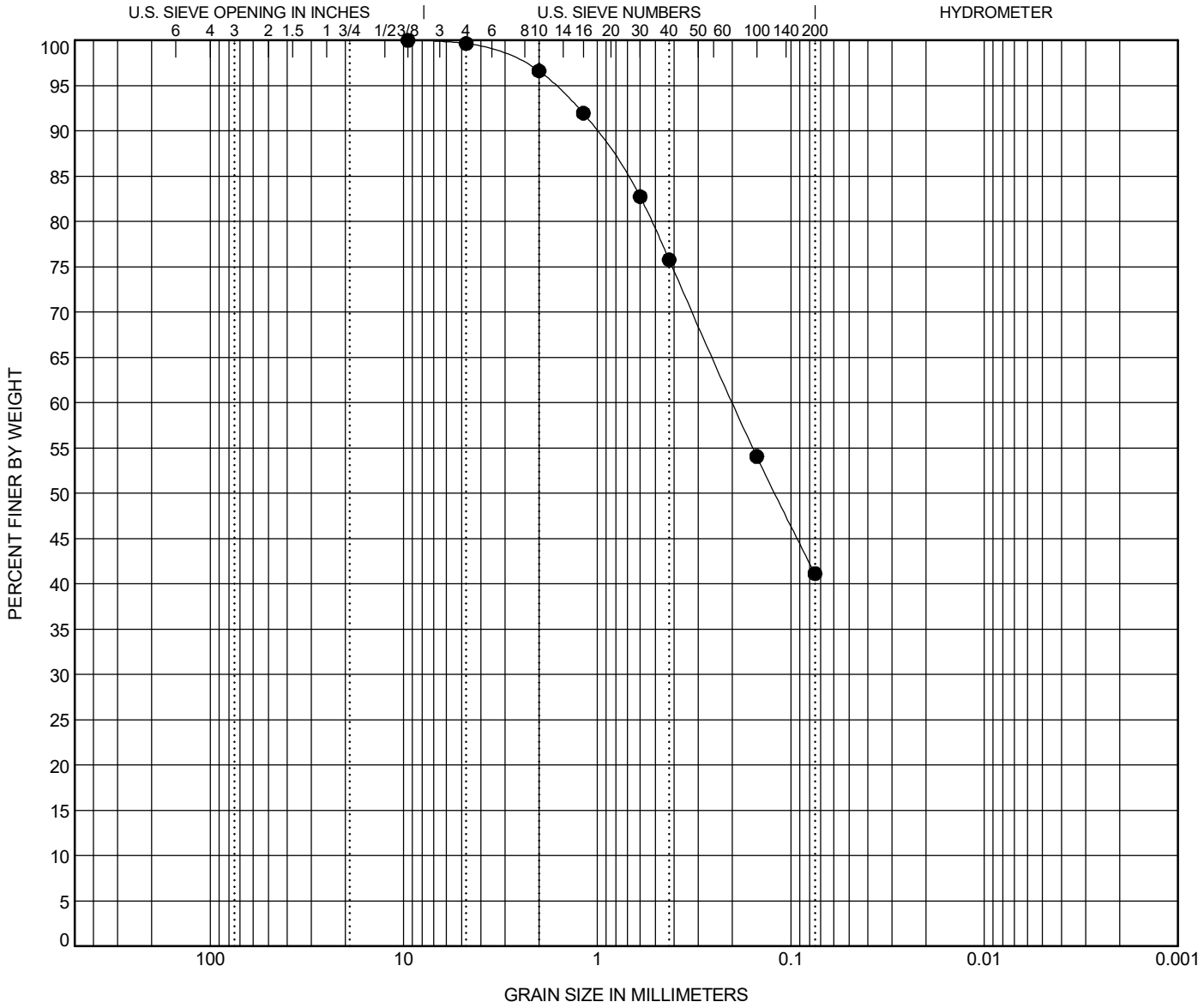
CLIENT Liberty Homes

PROJECT NAME Riverview Terrace Subdivision

PROJECT NUMBER 17-103.1

PROJECT LOCATION Carson City, Nevada



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **TP-07**	**5.0**	**SILTY SAND (SM)**					

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **TP-07**	**5.0**	**9.5**	**0.199**			**0.3**	**58.5**	**41.1**	

ATTERBERG LIMITS' RESULTS

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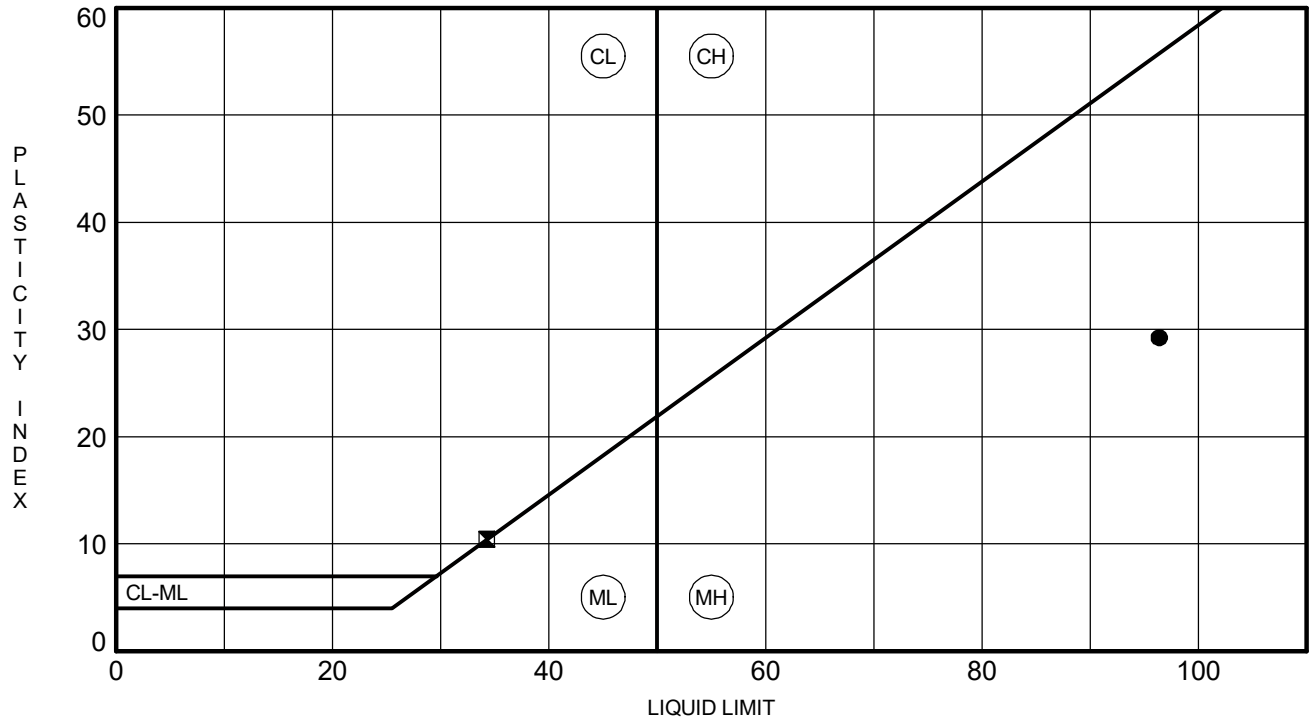
CLIENT Liberty Homes **PROJECT NAME** Riverview Terrace Subdivision

PROJECT NUMBER 17-103.1 **PROJECT LOCATION** Carson City, Nevada



	TEST PIT	DEPTH	LL	PL	PI	Fines	Classification
●	**TP-04**	**2.0**	**96**	**67**	**29**	**93**	**UNCONTROLLED FILLL-SANDY SILT (ML)**
⊠	**TP-05**	**4.0**	**34**	**24**	**10**	**67**	**SANDY CLAY (CL)**